

JANUARY 21, 2010

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# 2008 ANNUAL REPORT

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## TRACKING WORK-RELATED DEATHS IN MICHIGAN



January 21, 2010

MICHIGAN

# 2008 ANNUAL REPORT TRACKING WORK-RELATED DEATHS IN MICHIGAN

**F**atality  
**A**ssessment &  
**C**ontrol  
**E**valuation

Prevention through comprehensive research and investigation

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There are many resources available to help employers, employees, safety and health professionals and others understand more about work-related deaths. Links to these resources can be found at: [www.oem.msu.edu](http://www.oem.msu.edu).

## Acronyms

**BLS** Bureau of Labor Statistics

**MDELEG** Michigan Department of Energy, Labor & Economic Growth

**MSU OEM** Michigan State University Occupational and Environmental Medicine Division

**MIFACE** Michigan Fatality Assessment and Control Evaluation

**NIOSH** Michigan Occupational Safety & Health Administration

**NAICS** North American Industrial Classification System

**NIOSH** National Institute for Occupational Safety & Health

**OSHA** Occupational Safety and Health Administration

**SOC** Standard Occupational Code



*A male journeyman mason died as a result of falling from an unguarded working surface of a Hydro Mobile 2 scaffold raised to 35 feet.*

**This report was funded by NIOSH, under cooperative agreement #I U60 CC521205-01**

Thanks to the health and safety commitment of those employers, health and safety professionals, and regulatory personnel who understand the significance of ensuring a safe workplace, as well as all of the people who took the time to share their thoughts and experience about a work-related death and its impact on their life.

## Summary

This is the 8th annual report on acute traumatic work-related (WR) deaths in Michigan. There were **121 WR deaths in 2008**, representing 119 different employers and 117 incidents. The number of deaths was similar to 2007 when there were 120 WR deaths.

- ♦ Construction had the highest number of WR deaths (28), followed by Agriculture (16), Manufacturing (14), and then Transportation/Warehousing (11).



*A farmer died when his clothing became entangled in an unguarded rotating motor drive-shaft on a farm-modified ear-corn elevator. MIFACE Investigation Report 08MI135*

## *Summary, continued...*

- ◆ The largest numerical change in the number of deaths occurred in Construction - the number of deaths increased from 18 in 2007 to 28 in 2008.
- ◆ Agriculture and Construction had the highest risk of incurring a WR death per 100,000 workers (18.7 each). Mining was next (15.7) and then Transportation/Warehousing (11.0).
- ◆ The most common cause of death was motor vehicles (30), followed by falls (26), struck by an object (16) and homicides (13).
- ◆ Individuals who died were most likely to be men (91%), white (83%), married (59%) and have at least a HS education (81%).
- ◆ The average age of death was approximately 49. The age at the time of death ranged from 16 to 91.
- ◆ The fatal injury occurred in 43 of Michigan's 83 counties. Wayne County had the highest number of fatal injuries (21).

## *Background*

In 2001, MSU OEM instituted a tracking program for all traumatic WR deaths, first with financial assistance from MDELEG and then from NIOSH. This is a joint project of MIOSHA/MDELEG and MSU OEM.

The goal of the MIFACE program is to prevent WR deaths by identifying and investigating work situations at high-risk for injury and disseminating prevention strategies to those who can intervene in the workplace.

**All WR deaths  
are required to  
be reported to  
MIOSHA within 8  
hours of the  
death.**

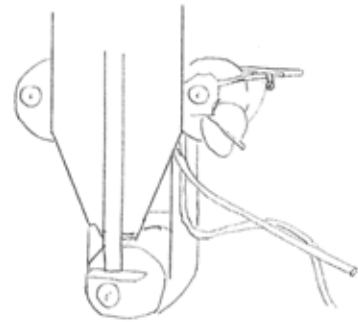
**The toll-free  
hotline to report  
a death is:  
1-800-866-4674**

## *Work-Related Deaths Tracking Procedures...*

### **SOURCES USED TO IDENTIFY WR DEATHS**

- ◆ MIOSHA
- ◆ Newspapers
- ◆ Medical Examiners (ME), Police and Fire Departments
- ◆ Workers' Compensation Agency
- ◆ MSU Agricultural Extension
- ◆ Death Certificates

## WR Deaths Tracking Procedures in Michigan

IDENTIFY INDIVIDUALS	GATHER INFORMATION	CONTACT EMPLOYER/FARM FAMILY	MIFACE SITE VISIT
<ul style="list-style-type: none"> <li>◆ <b>Receive Report of Death</b></li> <li>◆ <b>Determine if WR Death</b> <ul style="list-style-type: none"> <li>- Paid employee or self employed</li> <li>- Working at job or family business when incident occurred</li> <li>- Traveling "while on-the-clock" or compensated travel</li> <li>- Volunteers</li> <li>- In parking lot of business</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <b>Contact</b> <ul style="list-style-type: none"> <li>- MIOSHA if MIOSHA investigation conducted</li> <li>- Appropriate Police and Fire Departments, request written report and pictures of incident scene, as appropriate.</li> <li>- Medical Examiner, obtain ME Death Scene investigation and autopsy reports</li> </ul> </li> <li>◆ <b>Obtain newspaper clippings</b></li> </ul>	<ul style="list-style-type: none"> <li>◆ <b>Send Letter and Brochure about MIFACE program</b></li> <li>◆ <b>Follow-up phone contact</b> <ul style="list-style-type: none"> <li>- Answer questions and inquire if employer and/or family will participate</li> <li>- Voluntary participation</li> <li>- If firm/family agree to participate, schedule date and time for MIFACE site visit</li> <li>- If firm/family decline to participate, case summary or MIFACE Summary of MIOSHA Investigation is written.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <b>Explain MIFACE program</b></li> <li>◆ <b>Complete appropriate re-search forms</b></li> <li>◆ <b>Conduct interviews with appropriate personnel</b> <ul style="list-style-type: none"> <li>- Learn about process, equipment involved, work activities of deceased, training, safety programs, etc.</li> </ul> </li> <li>◆ <b>Observe area and/or equipment involved</b></li> <li>◆ <b>Take pictures, ensuring identifiers are noted and removed for final report</b></li> </ul>
WRITE MIFACE REPORT	FOLLOW UP ACTIVITIES	FOLLOW UP ACTIVITIES	
<ul style="list-style-type: none"> <li>◆ <b>Report Includes:</b> <ul style="list-style-type: none"> <li>- Summary Statement</li> <li>- Detailed narrative of the investigation</li> <li>- Cause of death as determined by the Medical Examiner</li> <li>- Recommendations to prevent future fatalities, including a discussion</li> <li>- References</li> <li>- Pictures, drawings, sketches of equipment or source of injury</li> <li>- Review of draft report by outside experts and MIFACE Advisory Board</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <b>Identify Stakeholders</b> <ul style="list-style-type: none"> <li>- Internet search for similar companies and/or trade groups</li> </ul> </li> <li>◆ <b>Update Database</b> <ul style="list-style-type: none"> <li>- Information collected from each site visit and statewide tracking entered into a database</li> </ul> </li> <li>◆ <b>Analyze Data</b> <ul style="list-style-type: none"> <li>- Annual Report developed analyzing and discussing the data</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <b>Educational Outreach</b> <ul style="list-style-type: none"> <li>- Send MIFACE Report to Employer, Farm Family and Stakeholders</li> <li>- Write case summary or MIFACE Summary of MIOSHA Investigation</li> <li>- Post on MSU OEM website: MIFACE Summary of MIOSHA Investigation</li> <li>- Send notice of posted summary to MIFACE e-mail distribution list</li> <li>- Develop Hazard Alert</li> <li>- Guest speaker, display booths at health and safety conferences, industry trade group training programs</li> </ul> </li> </ul>	 <p><i>Steel industry supervisor died when he was pulled from a catwalk, struck against a conveyor system support structure and fell to the floor below. MIFACE Investigation Report 08MI001.</i></p>

## Results

### By the Numbers:

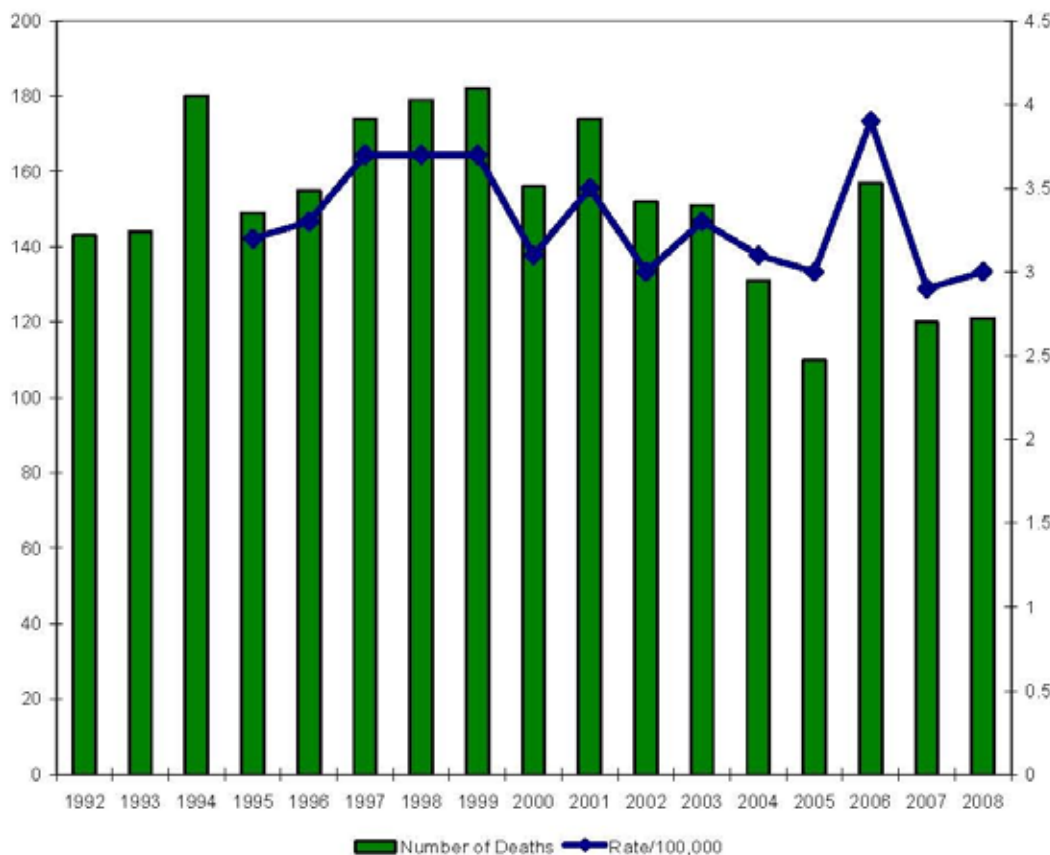
**151.6:** Average number of WR fatalities per year between 1992-2006.

**2.3:** Average number of 2008 traumatic WR fatalities per week although the deaths were not evenly distributed.

There were 121 traumatic work-related fatalities in 2008. One hundred twelve (92.6%) of the 121 work-related traumatic incidents occurred in 2008. Nine individuals died from complications from injuries that occurred prior to 2008:

- 1978: one individual was shot
- 1995: one individual fell from a roof
- 1998: one individual fell from a building wall
- 1999: one individual was struck by a 200# piece of Styrofoam
- 2002: one individual was struck by a bus
- 2006: one individual was assaulted at his store
- 2007: one individual fell from a scaffold
- 2007: one individual fell into a trash dumpster
- 2007: one individual overdosed on drugs

Figure 1. Number of Traumatic Work-Related Fatalities, Michigan 1992-2008



The number of traumatic work-related deaths per year in Michigan since 1992 is shown in Figure 1.

Incidence rates (per 100,000 workers) are shown by the **blue line**. Number of deaths are shown by the **green columns**. Rates shown from 1995-2000 were provided by the BLS website. Rates shown for 2001-2008 were determined from MIFACE statistics.

Incidence rates were not calculated for the years 1992-1994.



## Demographics

### Race

Table 1 shows the distribution of demographic characteristics of all WR fatalities in Michigan in 2008.

Ninety one (82.7%) men were Caucasian, 13 (11.8%) men were African-American, 2 (1.8%) men were Asian/Pacific Islander, and 1 (0.9%) man was an American Indian/Alaskan Native. Three (2.7%) men were identified as Hispanic. Nine (81.8%) women were Caucasian, 1 (9.1%) woman was African-American, and 1 (9.1%) woman was identified as Hispanic.

### Ethnicity

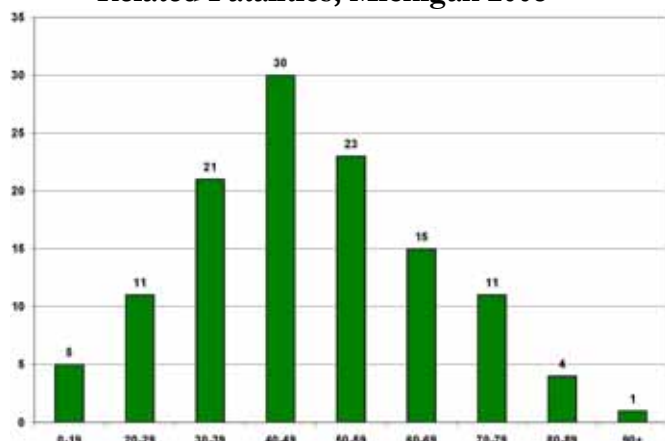
Seven individuals, six of whom were men, were Hispanic. Three of the six men identified above as Hispanic for their race were identified as Hispanic for their ethnicity, and 3 men identified as Caucasian for race were identified as Hispanic for ethnicity. One woman was identified as Hispanic for both race and ethnicity.

### Age

The age distribution of the individuals who died from a work-related injury is shown in Table 1 and Figure 2. The ages ranged from 16 to 91, with 1 death in a youth (age 16) and 16 (13.2%) deaths in individuals 70+ years old.

The average age was 48.7 years, which was similar to the average of 48.2 years in 2007.

**Figure 2. Age Distribution of Work-Related Fatalities, Michigan 2008**



**Table 1. Demographic Characteristics of Work-Related Fatalities, Michigan 2008**

		Number	Percent
<b>Gender</b>			
	Male	110	90.9
	Female	11	9.1
<b>Race</b>			
	White	100	82.6
	Black	14	11.6
	Asian/Pacific Islander	2	1.7
	American Indian/Alaskan Native	1	0.8
	Hispanic (as identified on DC)	4	3.3
<b>Age</b>			
	<20	5	4.1
	20-29	11	9.1
	30-39	21	17.4
	40-49	30	24.8
	50-59	23	19.0
	60-69	15	12.4
	70-79	11	9.1
	80-89	4	3.3
	90+	1	0.8
<b>Marital Status</b>			
	Never Married	24	19.8
	Married	68	56.2
	Divorced	23	19.0
	Widowed	6	5.0
<b>Educational Level</b>			
	Less than High School	24	20.0
	High School Graduate	57	47.5
	Some College (1-4 years)	34	28.3
	Post College (5+ years)	5	4.2
	Unknown	1	--
<b>Total</b>		<b>121</b>	

Individuals 40-49 years of age had the greatest number of deaths (30, 24.8%), followed by individuals in the age group of 50-59 years of age (23, 19.0%).

## Demographics, continued...

### Age

Table 2 shows the age of the individual who died and the industry in which he/she worked. Eight (50.0%) of 16 individuals with ages ranging from 70-91 who died from traumatic WR incidents worked in Agriculture; seven individuals were farmers and one individual was a horse trainer. Five of the seven deaths involved tractors, one death was a fall from a ladder and one farmer drowned.

Among the other deaths in individuals 70-91, two individuals worked in Construction, (one individual died as a result of a fall and one individual was pinned under a bulldozer that tipped during loading onto a trailer); two individuals worked in Arts, Entertainment and Recreation, (one individual was a race car driver whose car left the raceway and one individual fell from an airplane tug); one individual who worked in Retail Trade, one individual who worked in Educational Services and one individual who worked in Accommodation and Food Service died as a result of a fall; and one individual who worked in Public Administration was struck by a motor vehicle.

Fifteen (53.6%) of the 28 deaths in Construction occurred among individuals aged 30 to 49. Similarly, Manufacturing, Transportation and Warehousing, Administrative and Support and Waste Management and Remediation Services all had greater than one half (8, 57.1%; 6, 54.5%; and 4, 80.0%, respectively) of the deaths were among individuals 30 to 49 years of age.

**Table 2. Traumatic Work-Related Fatalities by Age of Victim and Industry Sector, Michigan 2008**

Industry Sector (NAICS Code)	13-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
	Number	Number	Number	Number	Number	Number	Number	Number	Number	
Agriculture, Forestry, Fishing and Hunting (11)	--	--	--	3	3	2	3	4	1	16
Mining (21)	--	--	1	--	--	--	--	--	--	1
Utilities (22)	--	--	--	--	1	--	--	--	--	1
Construction (23)	1	3	7	8	5	2	2	--	--	28
Manufacturing (31-33)	--	--	2	6	6	--	--	--	--	14
Wholesale Trade (42)	1	--	--	1	--	1	--	--	--	3
Retail Trade (44-45)	1	1	1	1	1	4	1	--	--	10
Transportation and Warehousing (48-49)	--	1	3	3	2	2	--	--	--	11
Finance and Insurance (52)	--	--	--	1	--	--	--	--	--	1
Real Estate and Rental and Leasing (53)	--	--	1	--	--	1	--	--	--	2
Professional, Scientific, and Technical Services (54)	--	--	--	1	--	1	--	--	--	2
Administrative and Support and Waste Management and Remediation Services (56)	--	--	2	2	1	--	--	--	--	5
Educational Services (61)	--	--	--	--	--	--	1	--	--	1
Health Care and Social Assistance (62)	--	1	--	--	1	--	--	--	--	2
Arts, Entertainment, and Recreation (71)	--	--	--	--	--	1	2	--	--	3
Accommodation and Food Services (72)	1	3	--	1	--	--	1	--	--	6
Other Services (except Public Administration) (81)	--	1	2	2	2	1	--	--	--	8
Public Administration (92)	1	1	2	1	1	--	1	--	--	7
<b>Totals</b>	<b>5</b>	<b>11</b>	<b>21</b>	<b>30</b>	<b>23</b>	<b>15</b>	<b>11</b>	<b>4</b>	<b>1</b>	<b>121</b>

## Demographics, continued...

### Marital Status

Sixty-eight (56.2%) individuals who died from traumatic work-related incidents were married, 24 (19.8%) were never married, 23 (19.0%) were divorced, and 6 (5.0%) were widowed. Of the 110 men, 65 (59.1%) were married, 23 (20.9%) were never married, 19 (17.3%) were divorced, and 3 (2.7%) were widowed.

### Educational Level

Table 3 shows the distribution of educational level by industry. Overall, 24 (20.0%) individuals had not completed high school, 57 (47.5%) completed high school and received a high school diploma, 34 (28.3%) completed 1-4 years of college, and 5 (4.2%) had over five years (5+) of college. The educational level for 1 male individual was unknown.

### Within industries having 11

or more deaths, the most common education level among individuals who died was completing high school but no college. Construction had the highest percentage of individuals who were high school graduates but did not attend college (17, 63.0%).

Thirty-nine (32.5%) individuals who died had attended college for at least one year; 34 (28.3%) had attended for 1-4 years, and 5 (4.2%) had attended for 5+ years. Construction and Transportation and Warehousing each had 4 individuals who had 1-4 years of college die due to a WR incident (14.8% and 36.4% respectively).

Twenty-four (20.0%) individuals who died had not completed high school. Agriculture and Construction had the greatest number of individuals who had not complete high school (5 each, 31.3% and 18.5% respectively). One of the 24 deaths included the 16-year-old youth.

**Table 3. Traumatic Work-Related Fatalities by Educational Level of Victim and Industry Sector, Michigan 2008**

Industry Sector (NAICS Code)	Did Not Complete High School		Completed High School No College		Some College (1-4 Years)		Post College (5+ Years)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Agriculture, Forestry, Fishing and Hunting (11)	5	31.3	9	56.3	1	6.3	1	6.3
Mining (21)	1	100.0	--	--	--	--	--	--
Utilities (22)	--	--	--	--	1	100.0	--	--
Construction (23) <sup>a</sup>	5	18.5	17	63.0	4	14.8	1	3.7
Manufacturing (31-33)	3	21.4	8	57.1	3	21.4	--	--
Wholesale Trade (42)	1	33.3	--	--	2	66.7	--	--
Retail Trade (44-45)	3	30.0	3	30.0	4	40.0	--	--
Transportation and Warehousing (48-49)	1	9.1	6	54.5	4	36.4	--	--
Finance/Insurance (52)	--	--	--	--	1	100.0	--	--
Real Estate and Rental and Leasing (53)	--	--	1	50.0	1	50.0	--	--
Professional, Scientific, and Technical Services (54)	--	--	1	50.0	--	--	1	50.0
Administrative and Support and Waste Management and Remediation Services (56)	1	20.0	3	60.0	1	20.0	--	--
Educational Services (61)	--	--	--	--	1	100.0	--	--
Health Care and Social Assistance (62)	--	--	1	50.0	1	50.0	--	--
Arts, Entertainment, and Recreation (71)	--	--	2	66.7	1	33.3	--	--
Accommodation and Food Services (72)	2	33.3	3	50.0	1	16.7	--	--
Other Services (except Public Administration) (81)	1	12.5	3	37.5	2	25.0	2	25.0
Public Administration (92)	1	14.3	--	--	6	85.7	--	--
<b>Total</b>	<b>24</b>	<b>20.0</b>	<b>57</b>	<b>47.5</b>	<b>34</b>	<b>28.3</b>	<b>5</b>	<b>4.2</b>

<sup>a</sup> Education level unknown for one individual.

Twenty-one (19.3%) of the 109 males had not completed high school, 52 (47.7%) had completed high school or obtained a GED, 31 (28.4%) had completed 1-4 years of college, and 5 (4.6%) individuals had completed 5+ years of college.



## Demographics, continued...

### Drug/Alcohol/Medication Use

Of the 110 individuals whose death was not a suicide or a drug overdose, a toxicology screen was performed on 74 (67.3%) individuals for alcohol and 82 (74.5%) individuals for illegal, prescription and non-prescription drugs. Twenty-four of these individuals had detectable levels of alcohol, illegal, prescription, or non-prescription drugs in their bloodstream. Fourteen of the 24 individuals had levels on autopsy that may have been a contributory factor to the fatal incident. Blood alcohol levels above 0.08% (0.18%, 0.21%, and 0.25%), were considered to be contributory. Illegal drugs included marijuana and phencyclidine (PCP). Prescription medications included bupropion, hydrocodone and verapamil. Non-prescription medications included diphenylhydramine and pseudoephedrine.

## Work-Related Event Details

### Day of Injury

Overall, the largest number of work-related fatal injuries occurred on a Monday and Thursday (21 each, 17.8%). Friday had the next highest number of work-related fatal injuries (20, 16.9%). Wednesday had 18 (15.3%) fatal injuries, Sunday had 15 (12.7%), Saturday had 12 (10.3%), and Tuesday had 11 (9.3%). The day of the fatal injury was unknown for 3 individuals.

Table 4 shows the day of injury for industries with 11 or more deaths.

In Construction, Thursday (6, 23.1%) and Monday (5, 19.2%) had the greatest number of deaths. In Agriculture, 53% of the fatal injuries in Agriculture occurred on Saturday and Sunday (4 each, 26.7%). Thursday had 5 deaths (33.3%)

In Manufacturing, fatal injuries were

fairly evenly distributed through the traditional workweek (Thursday had 4 (28.6%) fatal injuries, 3 each on Monday, Wednesday, and Friday, 21.4%).

Wednesday was the weekday when most homicides and work-related fatal injuries in the Transportation and Warehousing industry occurred (4, 30.8% and 3, 27.3%, respectively).

**Table 4. Traumatic Work-Related Fatalities by Day of Injury and Industry Sector, Michigan 2008**

Day of Injury	All Deaths		Construction <sup>a</sup> (NAICS 23)		Manufacturing (NAICS 31-33)		Agriculture, Forestry, Fishing and Hunting (NAICS 11)		Transportation and Warehousing (NAICS 48-49)		Homicides	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Sunday	15	12.7	3	11.5	--	--	4	26.7	1	9.1	3	23.1
Monday	21	17.8	5	19.2	3	21.4	1	6.7	1	9.1	3	23.1
Tuesday	11	9.3	2	7.7	1	7.1	--	--	2	18.2	1	7.7
Wednesday	18	15.3	4	15.4	3	21.4	--	--	3	27.3	4	30.8
Thursday	21	17.8	6	23.1	4	28.6	5	33.3	2	18.2	--	--
Friday	20	16.9	3	11.5	3	21.4	1	6.7	2	18.2	1	7.7
Saturday	12	10.2	3	11.5	--	--	4	26.7	--	--	1	7.7
<b>Total</b>	<b>118<sup>*</sup></b>		<b>26<sup>b</sup></b>		<b>14</b>		<b>15<sup>c</sup></b>		<b>11</b>		<b>13</b>	

<sup>\*</sup> Day of Week unknown for three individuals <sup>a</sup> Only industries with 11 or more deaths are included in the table.

<sup>b</sup> Day of Week unknown for two individuals and one individual was a homicide victim. <sup>c</sup> Day of Week unknown for one individual.

## Work-Related Event Details, continued...

### Month of Injury

Overall, June had the highest number of injuries resulting in fatalities with 15 (12.5%), followed by September and October (14 each, 11.7%), and January (13, 10.8%) and then March and July (11 each, 9.2%). August had 9 (7.5%) incidents, November had 8 (6.7%) incidents, February and December had 7 each (5.8%) incidents, May had 6 (5.0%) and April had 5 (4.2%) incidents. Table 5 shows the month of injury for industries with 11 or more deaths.

**Table 5. Traumatic Work-Related Fatalities by Month of Injury and Industry Sector, Michigan 2008**

Month of Injury	All Deaths		Construction <sup>a</sup> (NAICS 23)		Manufacturing (NAICS 31-33)		Agriculture, Forestry, Fishing and Hunting Deaths (NAICS 11)		Transportation and Warehousing (NAICS 48-49)		Homicides	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
January	13	10.7	4	14.3	4	28.6	--	--	1	9.1	1	7.7
February	7	5.8	1	3.6	1	7.1	--	--	2	18.2	2	15.4
March	11	9.1	2	7.1	4	28.6	1	6.3	2	18.2	1	7.7
April	5	4.1	4	14.3	1	7.1	--	--	--	--	--	--
May	6	5.0	1	3.6	--	--	3	18.8	--	--	--	--
June	15	12.4	2	7.1	--	--	5	31.3	--	--	--	--
July	11	9.1	2	7.1	2	14.3	--	--	--	--	3	23.1
August	9	7.4	1	3.6	--	--	2	12.5	1	9.1	--	--
September	14	11.6	3	10.7	--	--	1	6.3	3	27.3	1	7.7
October	14	11.6	4	14.3	--	--	4	25.0	1	9.1	1	7.7
November	8	6.6	2	7.1	1	7.1	--	--	--	--	1	7.7
December	8	6.6	2	7.1	1	7.1	--	--	1	9.1	3	23.1
<b>Total</b>	<b>121</b>		<b>28<sup>b</sup></b>		<b>14</b>		<b>16</b>		<b>11</b>		<b>13</b>	

<sup>a</sup> Only industries with 11 or more deaths are included in the table. <sup>b</sup> One individual was a homicide victim.

**Construction** was the only industrial sector where at least one fatal injury occurred each month. January, April and October each had 4 (14.3%) incidents, followed by September (3, 10.7%).

In **Manufacturing**, January and March were the months most likely to have a fatal injury occur (4 each, 30.8%). Six months (May, June, August, September, October, and December) did not have a fatal injury.

In **Agriculture**, June had 5 (31.3%) fatal injuries, October had 4 (25.0%), and May had 3 (18.8%) fatal injuries. Like Manufacturing, six months of the year did not have a fatal injury (January, February, April, July, November and December).

**Transportation and Warehousing** also had a significant number of months that did not have a fatal injury occur (April, May, June, July and November). September had 3 (27.3%) fatal injuries, February and March had 2 each (18.2%) and January, August, October and December had 1 each (9.1%).

The largest number of work-related **homicides** occurred in June and December (3 each, 23.1%) followed by February (2, 15.4%). Four months (April, May, June and August) did not have a work-related homicide occur.

## Work-Related Event Details, continued...

**Since 2001,  
123 WR  
fatalities have  
occurred in  
the month of  
October.**

**July is next  
with 113, then  
June with  
108.**

### Month of Injury, cont.

Table 6 shows the means of death by the month the injury occurred. June and September were the months with the largest number of fatal work-related motor vehicle incidents (7 each, 23.3%), 3 (10.0%) each occurred in March, and May. Two (6.7%) each occurred in February, July, August, and October. Most of the fatal falls occurred in the winter months of January and March (4 each, 15.4%), followed by July, August and December (3 each, 11.5%).

The winter months of December-March accounted for 46.2% of all fatal fall incidents. October had 3 (18.8%) struck by incidents, followed by April, June, and November with 2 (12.5%) incidents each. Machine-related incidents were most likely to occur in March, July, September and October (2 each, 18.2%).



*A journeyman lineman working from an insulated bucket was electrocuted during the installation of a new 15 KV switch for a single phase, 7,200-volt overhead power line suspended from a wood pole. MIFACE Investigation 08MI037.*

**Table 6. Traumatic Work-Related Fatalities by Month of Injury and Cause of Death, Michigan 2008**

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
Animal	--	--	--	--	--	1	--	--	--	--	--	--	1
Asphyxiation	--	1	--	--	--	--	--	--	--	--	--	--	1
Drowning	--	--	--	--	--	1	--	--	--	--	--	--	1
Drug Overdose	1	--	--	--	--	--	--	--	--	--	--	1	2
Electrocution	1	--	--	--	--	2	--	--	1	--	1	--	5
Fall	4	1	4	2	--	2	3	3	1	1	2	3	26
Fire/Explosion	3	--	--	--	--	--	--	--	--	--	--	--	3
Homicide	1	2	1	--	--	--	3	--	1	1	1	3	13
Machine	--	--	2	1	1	--	2	2	2	2	--	--	12
Motor Vehicles	1	2	3	--	3	7	2	2	7	2	1	--	30
Struck By	1	--	1	2	1	2	1	1	1	3	2	1	16
Suicide	--	1	--	--	1	--	--	1	1	4	1	--	9
Toxic Exposure	1	--	--	--	--	--	--	--	--	1	--	--	2
<b>Total</b>	<b>13</b>	<b>7</b>	<b>11</b>	<b>5</b>	<b>6</b>	<b>15</b>	<b>11</b>	<b>9</b>	<b>14</b>	<b>14</b>	<b>8</b>	<b>7</b>	<b>121</b>

## Work-Related Event Details, continued...

### Time of Injury

The time of the injury could be determined within a 4-hour time period in 107 of the 121 (88.4%) work-related deaths. The 24-hour day was divided into 4-hour time periods: 12:00 a.m. - 3:59 a.m., 4:00 a.m. - 7:59 a.m., 8:00 a.m. - 11:59 a.m., 12:00 p.m. - 3:59 p.m., 4:00 p.m. - 7:59 p.m., and 8:00 p.m. - 11:59 p.m.

Table 7 shows the 4-hour time periods for industries with 11 or more deaths.

Overall,

- ◆ 29 (27.1%) fatal injuries occurred between 8:00 a.m. - 11:59 a.m.,
- ◆ 27 (25.2%) occurred between 12:00 p.m. - 3:59 p.m.,
- ◆ 21 (19.6%) occurred between 4:00 p.m. - 7:59 p.m.,
- ◆ 15 (14.0%) occurred between 4:00 a.m. - 7:59 a.m.,
- ◆ 10 (9.3%) occurred between 8:00 p.m. - 11:59 p.m., and
- ◆ 5 (4.7%) occurred between 12:00 a.m. - 3:59 a.m.

In Agriculture, for the 13 individuals with a known time of injury, the time period of 12:00 p.m.-3:59 p.m. had 5 (38.5%) incidents.



In Construction, for the 25 individuals with a known time of injury, one-third of the injuries occurred between 8:00 a.m. to 11:59 p.m. There were no fatal work-related injuries in the 12-hour time period of 8:00 p.m. and 7:59 a.m.

In Manufacturing, two 4-hour time periods (8:00 a.m.-11:59 a.m. and 4:00 p.m. - 7:59 p.m.) had 4 (30.8%) fatal injuries each.

Of the five work-related fatal injuries which took place between 12:00 a.m.-3:59 a.m., three of them occurred in Transportation and Warehousing. Three deaths occurred between 4:00 a.m. and 7:59 a.m.

Most WR homicides (3, 33.3%) occurred between 8:00 p.m. and 11:59 p.m.

**Table 7. Traumatic Work-Related Fatalities by Time of Incident and Industry, Michigan 2008**

Time of Day	All Deaths		Construction <sup>a</sup> (NAICS 23)		Manufacturing (NAICS 31-33)		Agriculture, Forestry, Fishing and Hunting (NAICS 11)		Transportation and Warehousing (NAICS 48-49)		Homicides	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
12am-3:59am	5	4.7	--	--	--	--	--	--	3	30.0	1	11.1
4am-7:59am	15	14.0	2	8.0	3	23.1	--	--	3	30.0	--	--
8am-11:59am	29	27.1	9	36.0	4	30.8	3	23.1	1	10.0	2	22.2
12pm-3:59pm	27	25.2	7	28.0	1	7.7	5	38.5	2	20.0	2	22.2
4pm-7:59pm	21	19.6	7	28.0	4	30.8	4	30.8	--	--	1	11.1
8pm-11:59pm	10	9.3	--	--	1	7.7	1	7.7	1	10.0	3	33.3
<b>Total</b>	<b>107<sup>e</sup></b>		<b>25<sup>b</sup></b>		<b>13<sup>c</sup></b>		<b>13<sup>d</sup></b>		<b>10<sup>c</sup></b>		<b>9<sup>c</sup></b>	

<sup>a</sup> Time of Injury unknown for 14 individuals. <sup>b</sup> Only industries with 11 or more deaths are included in the table.

<sup>c</sup> Time of Injury was unknown for three deaths and one individual was a homicide victim. <sup>e</sup> Time of Injury unknown for one individual.

<sup>d</sup> Time of Injury was unknown for three individuals. <sup>f</sup> Time of Injury unknown for four individuals.



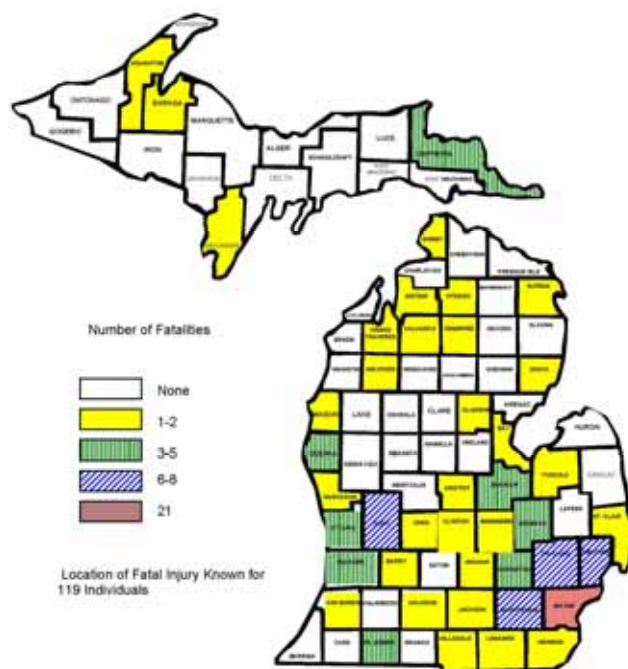
## Work-Related Event Details, continued...

### Location in State

Table 8 and Figure 3 show the county in which the decedent worked where he/she was fatally injured. Work-related fatal injuries occurred in 43 (53.1%) of Michigan's 83 counties. The county of the fatal injury was unknown for two incidents.

Wayne County had the largest number of fatal injuries, 21. The southeast Michigan counties of Wayne, Oakland, Macomb, and Washtenaw accounted for 43 (53.1%) of the fatal work-related injuries. Oakland County had 8 (6.7%) fatal injuries, and Macomb and Washtenaw counties each had 7 (5.8%) fatal injuries. Kent County had 8 (6.7%) work-related fatal injuries. Allegan had 5 (4.2%) fatal injuries, and Ottawa had 4 (3.3%) fatal injuries.

**Figure 3. Work-Related Fatal Injuries by County of Incident, Michigan 2008**



**Table 8. Work-Related Fatal Injuries by County of Incident, Michigan 2008**

County	Number	Percent	County	Number	Percent	County	Number	Percent
Alcona			Gratiot	1	0.8	Missaukee		
Alger			Hillsdale	1	0.8	Monroe	2	1.7
Allegan	5	4.2	Houghton	1	0.8	Montcalm		
Alpena	1	0.8	Huron			Montmorency		
Antrim	2	1.7	Ingham	2	1.7	Muskegon	2	1.7
Arenac			Ionia	1	0.8	Newaygo		
Baraga	1	0.8	Iosco	1	0.8	Oakland	8	6.7
Barry	2	1.7	Iron			Oceana	3	2.5
Bay	1	0.8	Isabella			Ogemaw		
Benzie			Jackson	2	1.7	Ontonagon		
Berrien			Kalamazoo			Osceola		
Branch			Kalkaska	2	1.7	Oscoda		
Calhoun	3	2.5	Kent	8	6.7	Otsego	1	0.8
Cass			Keweenaw			Ottawa	4	3.4
Charlevoix			Lake			Presque Isle		
Cheboygan			Lapeer			Roscommon		
Chippewa	3	2.5	Leelanau			Saginaw	3	2.5
Clare			Lenawee	1	0.8	St. Clair	1	0.8
Clinton	1	0.8	Livingston	3	2.5	St. Joseph	3	2.5
Crawford	1	0.8	Luce			Sanilac		
Delta			Mackinac			Schoolcraft		
Dickinson			Macomb	7	5.9	Shiawassee	1	0.8
Eaton			Manistee			Tuscola	2	1.7
Emmet	1	0.8	Marquette			Van Buren	2	1.7
Genesee	3	2.5	Mason	1	0.8	Washtenaw	7	5.9
Gladwin	1	0.8	Mecosta			Wayne	21	17.6
Gogebic			Menominee	1	0.8	Wexford	1	0.8
Grand Traverse	1	0.8	Midland			Unknown	2	

### Place of Death

For 55 (45.5%) individuals, the place of death was at the scene of the traumatic incident. For 58 (47.9%) individuals, the place of death was the hospital, and for 2 (1.7%) individuals, the place of death was identified as an ambulance. Four (3.3%) individuals died at home and/or under hospice care and 2 (1.6%) individuals died in a nursing home.



## *Work-Related Death Details, continued...*

### Industry Information

Table 9 shows the number of work-related fatalities and Michigan's annual incidence rate by industry sector for number of employees and by hours worked for 2008.

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

Hours-based 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). Hours-based incidence rates were not available for all Michigan industry sectors.

The 2002 North American Industry Classification System (NAICS) has 20 sectors grouping establishments into industries according to primary economic activity. NAICS uses a 6-digit coding system to identify particular industries and how those industries are placed within the NAICS coding structure. MIFACE classifies an establishment to an industry when the establishment's primary activity meets the definition for that industry.

### DIFFERENCES IN RATES

Employment- and hours-based rates will be similar for groups of workers who tend to work full-time. However, differences will be observed for worker groups who tend to have a high percentage of part-time workers, such as younger workers.

### Industry Highlights, Michigan 2008

- ◆ The number of work-related deaths in 2008 increased by one death to 121 compared to the 120 work-related deaths in 2007.
- ◆ The number of work-related deaths in Construction increased by 64%; from 18 work-related deaths in 2007 to 28 in 2008, but was down from 42 in 2006.
- ◆ Agriculture had an increase in the number of WR; 16 individuals died in 2008 compared to 13 in 2007.
- ◆ Four industrial sectors had one more death occur in 2008 compared to 2007: Real Estate and Rental and Leasing and Professional, Scientific and Technical Services had two deaths, Arts Entertainment and Recreation had three deaths, and Accommodation and Food Services had six deaths. Mining had 1 death.
- ◆ Four industry sectors, Utilities, Manufacturing, Retail Trade and Transportation and Warehousing had the same number of deaths in 2008 as in 2007.
- ◆ Three industry sectors had a decrease of five deaths; Administrative and Support and Waste Management and Remediation Services and Information.
- ◆ **Incidence Rates (per 100,000 workers)** for all 2-digit NAICS industry sectors
  - ◆ Agriculture, Forestry, Fishing and Hunting (18.7)
  - ◆ Construction (18.7).
  - ◆ Mining (15.7),
  - ◆ Transportation and Warehousing (11.1),
  - ◆ Other Services (6.3),
  - ◆ Manufacturing (2.4).
- ◆ Hours-based incidence rates were similar to the employment-based incidence rates except for Arts, Entertainment and Recreation (9.0 compared to 4.9, respectively), Accommodation and Food Services (3.2 compared to 1.8) and Construction (21.5 compared to 18.7).

**Table 9. Work-Related Fatalities and Incidence Rates by Industry Sector, Michigan 2008**

Industry Sector (NAICS Code)	Number    Percent		Employment-Based		Hours-Based (per 100,000 FTE)	
			Number of Employees <sup>a</sup>	Rate <sup>b</sup>	Number of Hours <sup>c</sup>	Rate <sup>d</sup>
<b>Agriculture, Forestry, Fishing and Hunting (11)</b>	<b>16</b>	<b>13.2</b>	<b>85,339<sup>e</sup></b>	<b>18.7</b>		
Crop Production (111)	13	10.7	50,170 <sup>e</sup>	25.9		
Animal Production (112)	3	2.5	29,713 <sup>e</sup>	10.1		
<b>Mining (21)</b>	<b>1</b>	<b>0.8</b>	<b>6,388</b>	<b>15.7</b>		
Support Activities for Mining (213)	1	0.8	1,988	50.3		
<b>Utilities (22)</b>	<b>1</b>	<b>0.8</b>	<b>20,165</b>	<b>5.0</b>		
Electric Power Generation, Transmission and Distribution (221)	1	0.8	16,835	5.9		
<b>Construction (23)<sup>+</sup></b>	<b>28</b>	<b>23.1</b>	<b>149,495</b>	<b>18.7</b>	<b>34.8</b>	<b>21.5</b>
Heavy and Civil Engineering Construction (237)	9	7.4	15,783	57.0		
Specialty Trade Contractors (238)	18	14.9	100,267	18.0		
<b>Manufacturing (31-33)</b>	<b>14</b>	<b>11.6</b>	<b>575,814</b>	<b>2.4</b>	<b>42.2</b>	<b>2.3</b>
Food Manufacturing (311)	2	1.7	34,483	5.8		
Paper Manufacturing (322)	1	0.8	13,176	7.6		
Plastics and Rubber Products Manufacturing (326)	1	0.8	36,617	2.7		
Primary Metal Manufacturing (331)	3	2.5	23,179	12.9		
Fabricated Metal Product Manufacturing (332)	2	1.7	76,682	2.6	41.2	2.5
Machinery Manufacturing (333)	2	1.7	67,857	2.9	42.7	2.8
Transportation Equipment Manufacturing (336)	3	2.5	172,646	1.7	43.3	1.6
<b>Wholesale Trade (42)</b>	<b>3</b>	<b>2.5</b>	<b>165,025</b>	<b>1.8</b>	<b>38.5</b>	<b>1.9</b>
Merchant Wholesalers, Durable Goods (423)	1	0.8	93,630	1.1	39.3	1.1
Merchant Wholesalers, Nondurable Goods (424)	2	1.7	47,455	4.2	37.0	4.6
<b>Retail Trade (44-45)</b>	<b>10</b>	<b>8.3</b>	<b>474,875</b>	<b>2.1</b>	<b>30.4</b>	<b>2.8</b>
Motor Vehicle and Parts Dealers (441)	1	0.8	55,362	1.8	33.9	2.1
Building Material and Garden Equipment and Supplies Dealers (444)	1	0.8	41,385	2.4		
Food and Beverage Stores (445)	3	2.5	79,245	3.8	27.3	5.5
Gasoline Stations (447)	1	0.8	24,305	4.1		
Clothing and Clothing Accessories Stores (448)	1	0.8	40,165	2.5		

Table 9, continued....

Industry Sector (NAICS Code)	Number    Percent		Employment-Based		Hours-Based (per 100,000 FTE)	
			Number of Employees <sup>a</sup>	Rate <sup>b</sup>	Number of Hours <sup>c</sup>	Rate <sup>d</sup>
General Merchandise Stores (452)	1	0.8	112,251	0.9		
Non-Store Retailers (454)	2	1.7	9,163	21.8		
<b>Transportation and Warehousing (48-49)</b>	<b>11</b>	<b>9.1</b>	<b>100,031</b>	<b>11.0</b>		
Truck Transportation (484)	7	5.8	39,001	17.9		
Support Activities for Transportation (488)	4	3.3	14,575	27.4		
<b>Finance and Insurance (52)</b>	<b>1</b>	<b>0.8</b>	<b>145,220</b>	<b>0.7</b>	<b>35.8</b>	<b>0.8</b>
Securities, Commodity Contracts, and Other Financial Investments and Related Activities (523)	1	0.8	12,062	8.3		
<b>Real Estate and Rental and Leasing (53)</b>	<b>2</b>	<b>1.7</b>	<b>51,821</b>	<b>3.9</b>		
Real Estate (531)	2	1.7	35,862	5.6		
<b>Professional, Scientific, and Technical Services (54)</b>	<b>2</b>	<b>1.7</b>	<b>239,938</b>	<b>0.8</b>	<b>34.7</b>	<b>1.0</b>
Professional, Scientific, and Technical Services (541)	2	1.7	239,938	0.8		
<b>Administrative and Support and Waste Management and Remediation Services (56)</b>	<b>5</b>	<b>4.1</b>	<b>262,404</b>	<b>1.9</b>		
Administrative and Support Services (561)	4	3.3	251,348	1.6		
Waste Management and Remediation Services (562)	1	0.8	11,056	9.0		
<b>Educational Services (61)</b>	<b>1</b>	<b>0.8</b>	<b>418,300<sup>c</sup></b>	<b>0.2</b>		
Educational Services (611)	1	0.8	**	--		
<b>Health Care and Social Assistance (62)</b>	<b>2</b>	<b>1.7</b>	<b>558,300<sup>c</sup></b>	<b>0.4</b>	<b>34.6</b>	<b>0.4</b>
Ambulatory Health Care Services (621)	1	0.8	179,400 <sup>c</sup>	0.6		
Hospitals (622)	1	0.8	221,700 <sup>c</sup>	0.5	41.6	0.4
<b>Arts, Entertainment, and Recreation (71)</b>	<b>3</b>	<b>2.5</b>	<b>60,952</b>	<b>4.9</b>	<b>21.8</b>	<b>9.0</b>
Performing Arts, Spectator Sports, and Related Industries (711)	1	0.8	9,587	10.4		
Museums, Historical Sites, and Similar Institutions (712)	1	0.8	4,235	23.6		
Amusement, Gambling and Recreation (713)	1	0.8	47,131	2.1		
<b>Accommodation and Food Services (72)</b>	<b>6</b>	<b>5.0</b>	<b>333,638</b>	<b>1.8</b>	<b>22.2</b>	<b>3.2</b>
Accommodation (721)	1	0.8	32,825	3.0		



Table 9, continued....

Industry Sector (NAICS Code)	Number Percent		Employment-Based		Hours-Based (per 100,000 FTE)	
			Number of Employees <sup>a</sup>	Rate <sup>b</sup>	Number of Hours <sup>c</sup>	Rate <sup>d</sup>
Food Services and Drinking Places (722)	5	4.1	300,813	1.7		
<b>Other Services (except Public Administration) (81)</b>	<b>8</b>	<b>6.6</b>	<b>127,546</b>	<b>6.3</b>		
Repair and Maintenance (811)	4	3.3	23,544	17.0		
Religious, Grantmaking, Civic, Professional, and Similar Organizations (813)	4	3.3	47,637	8.4		
<b>Public Administration (92)</b>	<b>7</b>	<b>5.8</b>	<b>279,700<sup>c</sup></b>	<b>2.5</b>		
Justice, Public Order, and Safety Activities (922)	6	5.0	**	--		
Regulation and Administration of Transportation Programs (926)	1	0.8	**	--		
<b>Totals</b>	<b>121</b>		<b>4,054,951</b>	<b>3.0</b>		

<sup>a</sup> Source: Michigan Department of Energy, Labor and Economic Growth, Office of Labor Market Information, Industry Census of Employment & Wages (QCEW-ES202), Michigan, Year: 2008. Accessed November 13, 2009. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)

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

<sup>c</sup> Source: Michigan Department of Labor and Economic Growth, Office of Labor Market Information, Industry Employment (Establishments-CES) (IES), Michigan, Year: 2008. Accessed November 13, 2009. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)

<sup>d</sup> Rate represents the number of fatal occupational injuries per 100,00 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 all employees during the calendar 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 IES or QCEW-ES202 reports.

<sup>e</sup> Source: USDA, National Agricultural Statistics Service. 2007 Census of Agriculture, AC-07-A-51, Issued February 2009, Updated December 2009. [www.agcensus.usda.gov/Publications/2007/Full\\_Report/index.asp](http://www.agcensus.usda.gov/Publications/2007/Full_Report/index.asp). Accessed January 4, 2010.

Table 10 compares the hours-based incidence rate by industry in Michigan to national rates for 2008. The overall fatality rate per 100,000 workers in Michigan for 2007 was lower than the United States hours-based incidence rate (3.0 compared to the 3.6).

Of the Michigan industries with a known hours-based incidence rate, the Construction industry had a dramatically higher rate compared to the U.S. rate (21.5 compared to 9.6). Retail Trade had a slightly higher rate compared to the U.S. rate (2.8 compared to 2.0). Wholesale Trade had a lower rate compared to the U.S. rate (1.9 compared to 4.9). Manufacturing and Finance and Insurance had slightly lower rates (2.3 and 0.8, respectively) compared to U. S. Rates (2.5 and 1.0, respectively).

**Table 10. Work-Related Fatalities by Industry Sector, Michigan Rates Compared to US Rates, 2008**

Industry Sector <sup>a</sup> (NAICS Code)	Number of Fatalities	2008 MI Employment- based Rate <sup>b</sup>	2008 MI Hours- Based Rate <sup>c</sup>	2008 US Hours-Based Rate <sup>d</sup>
Agriculture, Forestry, Fishing and Hunting (11)	16	18.7	--	29.4
Mining (21)	1	15.7	--	18.0
Utilities (22)	1	5.0	--	3.8
Construction (23)	28	18.7	21.5	9.6
Manufacturing (31-33)	14	2.4	2.3	2.5
Wholesale Trade (42)	3	1.8	1.9	4.2
Retail Trade (44-45)	10	2.1	2.8	2.0
Transportation and Warehousing (48-49)	11	11.0	--	14.2
Finance and Insurance (52)	1	0.7	0.8	1.0
Real Estate and Rental and Leasing (53)	2	3.9	--	--
Professional and Business Services (54, 56)	7	1.4	--	2.7
Educational and Health Services (61, 62)	3	0.3	--	0.7
Leisure and Hospitality (71, 72)	9	2.3		2.2
Other Services (except Public Administration) (81)	8	6.3	--	2.5
Public Administration (92)	7	2.5	--	2.3
<b>Totals</b>	<b>121</b>	<b>3.0</b>		<b>3.6</b>



*A male farmer died when a portable farm elevator fell onto him as he was pulling it away from an ear corn bin with a 7 HP lawn tractor. MIFACE Investigation Report 08MI128.*



*A male air museum volunteer died from complications of a head injury sustained when he fell from an aircraft tug as the crew was traveling to assist a plane at an air show. MIFACE Investigation Report 08MI121.*

<sup>a</sup> Sources: USDA, National Agricultural Statistics Service. 2007 Census of Agriculture, AC-02-A-51, Issued February 2009, Updated December 2009. [www.nass.usda.gov/census/](http://www.nass.usda.gov/census/). Accessed January 4, 2010. Michigan Department of Labor and Economic Growth, Office of Labor Market Information, Industry Employment (Establishments-CES) (IES), Michigan, Year: 2008. Accessed November 13, 2009. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/). Michigan Department of Energy, Labor and Economic Growth, Office of Labor Market Information, Industry Census of Employment & Wages (QCEW-ES202), Michigan, Year: 2008. Accessed November 13, 2009. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)

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

<sup>c</sup> Source: Michigan Department of Labor and Economic Growth, Office of Labor Market Information, Industry Employment (Establishments-CES) (IES), Michigan, Year: 2007. Accessed November 13, 2009. [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)

<sup>d</sup> Bureau of Labor Statistics News, United States Department of Labor, USDL 07-1202, Release

**Federal total hours worked figures are annual average estimates of total at work multiplied by average hours for civilians, 16 years of age and older, from the Current Population Survey (CPS), 2008.**



## Work-Related Event Details, continued...

### Means of Death

Table 11 shows the means of death by industry sector. Motor vehicles were the leading cause of a WR fatality (30, 24.8%), followed by falls (26, 21.5%), struck by an object (16, 13.2) and then homicides (10.7%).

Motor vehicles were the leading cause of death in Transportation and Warehousing (6, 54.5%), Other Services (5, 62.5%), Public Administration (3, 42.9%) and Wholesale Trade (2, 66.7%).

Machines were the leading cause of death in Agriculture (5, 31.3%) and Manufacturing (4, 28.6%).

Homicides were the leading cause of death in Retail Trade (4, 40.0%) and Accommodation and Food Service (3, 50.0%).

Similar to all of the preceding years of MIFACE data collection, a fall was the leading cause of death in Construction (11 incidents, 39.3%). A fall was also the leading cause of death in Arts, Entertainment and Recreation (2, 66.7%).



*A male construction worker fell from the roof of a five-story building through a 26-inch by 24-inch make-up air opening of an elevator shaft to the concrete floor of the basement. MIFACE Investigation Report 08MI015*

**Table 11. Work-Related Fatalities by Means of Death and Industry Sector, Michigan 2008**

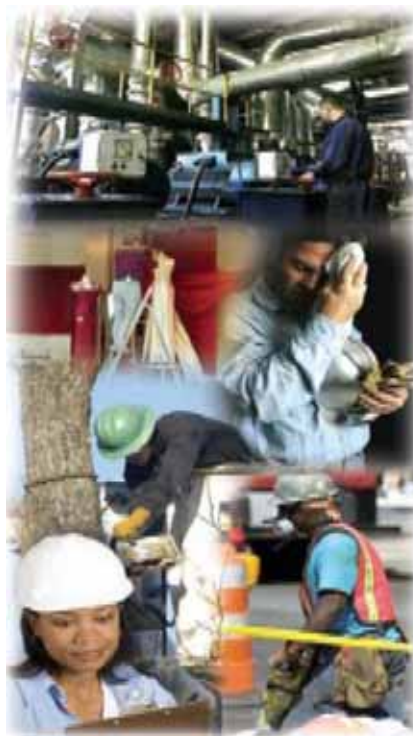
Industry Sector (NAICS Code)	Animal (0.8%)	Asphyxiation (0.8%)	Drowning (0.8%)	Drug Overdose (1.7%)	Electrocution (4.1%)	Fall (21.5%)	Fire/Explosion (2.5%)	Homicide (10.7%)	Machine (9.9%)	Motor Vehicle (24.8%)	Struck By (13.2%)	Suicide (7.4%)	Toxic Exposure (1.7%)	Total
Agriculture, Forestry, Fishing and Hunting (11)	1		1			2			6	2	2	1	1	16
Mining (21)										1				1
Utilities (22)					1									1
Construction (23)				1	3	11	1	1	2	1	5	3		28
Manufacturing (31-33)		1		1		3	1		4	1	2		1	14
Wholesale Trade (42)										2	1			3
Retail Trade (44-45)						2		4		2		2		10
Transportation and Warehousing (48-49)							1	1		6	3			11
Finance and Insurance (52)										1				1
Real Estate and Rental and Leasing (53)								1		1				2
Professional, Scientific, and Technical Services (54)						1				1				2
Administrative and Support and Waste Management and Remediation Services (56)					1	1		1		1	1			5
Educational Services (61)						1								1
Health Care and Social Assistance (62)										2				2
Arts, Entertainment, and Recreation (71)						2				1				3
Accommodation and Food Services (72)						1		3				2		6
Other Services (except Public Administration) (81)						2				5	1			8
Public Administration (92)								2		3	1	1		7
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>5</b>	<b>26</b>	<b>3</b>	<b>13</b>	<b>12</b>	<b>30</b>	<b>16</b>	<b>9</b>	<b>2</b>	<b>121</b>

## *Work-Related Event Details, continued...*

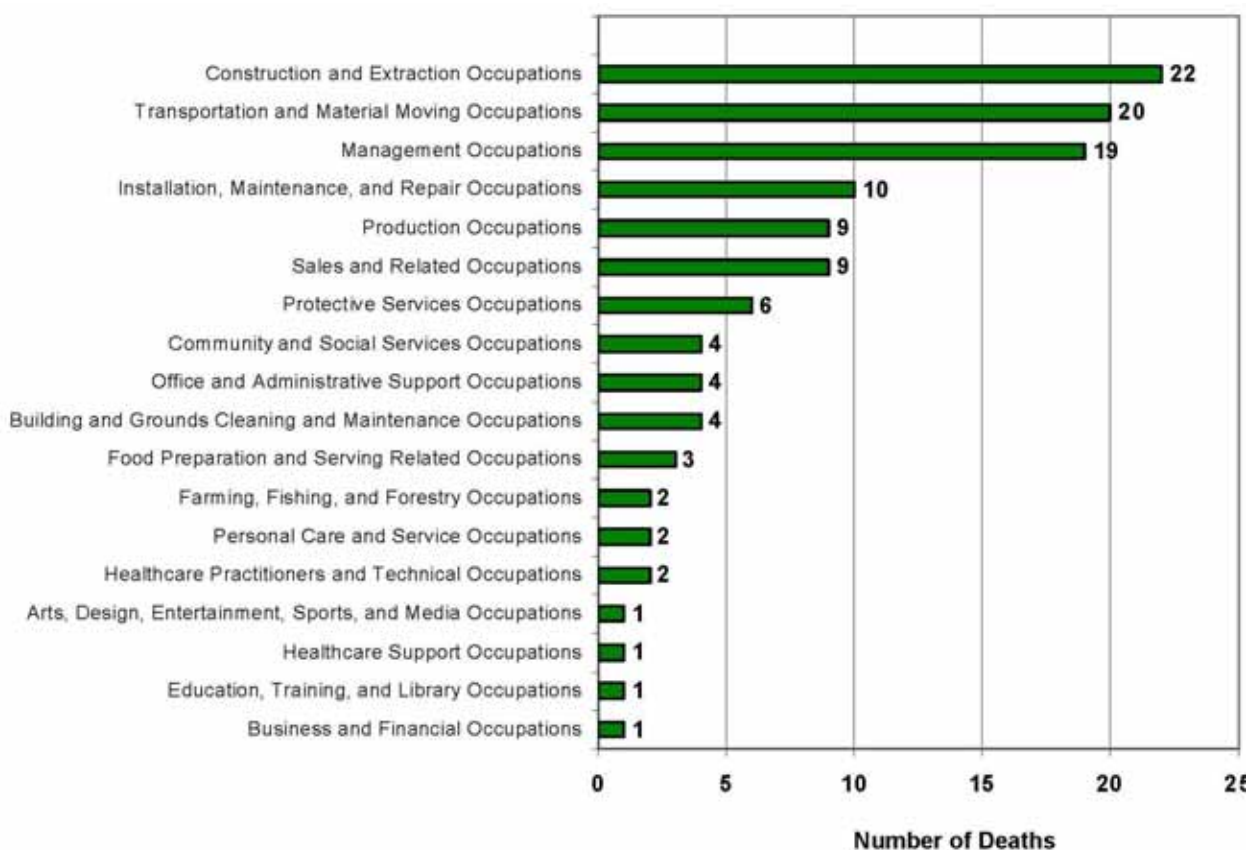
### ***Occupations***

Figure 4 shows the distribution of Standard Occupational Classification categories.

The 2000 Standard Occupational Classification<sup>3</sup> (SOC) system is used to categorize occupations of the individuals who died. The 2000 SOC is divided into 23 major groups, which are sometimes called “job families.” The “job families” group occupations according to the nature of the work performed, placing all people who work together into the same group regardless of their skill level. The 23 “job families” are further subdivided using a 6-digit structure into 821 detailed occupations.



**Figure 4. Work-Related Fatalities by Standard Occupational Code, Michigan 2008**



## *Work-Related Event Details, continued...*

### ***Occupations, continued***

The occupational category with the highest number of WR deaths was Construction and Extraction Occupations (47-0000) accounting for 22 (18.5%) of the 119 known occupations at the time of the fatal injury in 2008. Within this major grouping, Construction Trades Workers, specifically construction laborers (4 deaths) and painters (3 deaths) had the highest number of WR fatal injuries.

Transportation and Material Moving Occupations (53-0000) accounted for 20 (16.80%) deaths. Within this major grouping, 16 (80.0%) were Motor Vehicle Operators. Within the Motor Vehicle Operators group, 15 (93.8%) individuals were Truck Drivers, Heavy and Tractor-Trailer.

Management Occupations (11-000) was the next highest occupational category grouping and accounted for 19 (16.0%) of the all Michigan work-related deaths. Ten (523.6%) individuals were Farmers and Ranchers, and 5 (26.4%) individuals were General and Operations Managers.

Installation, Maintenance and Repair Occupations (49-0000) had 10 (8.4%) deaths and Production Operations (51-0000) and Sales and Related Occupations (41-0000) each had 9 (7.6%) deaths.

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

One hundred nineteen employers were associated with the 121 individuals who died on the job in 2008. Employer status, i.e. self-employed, employee, or temporary worker could not be established for four individuals.

Two employers had a fatal incident where more than one person died as a result of the incident.

Eighty-four (71.8%) individuals were identified as employees. Twenty-six (22.2%) individuals were identified as either self-employed or the business owner. Five (4.3%) individuals were identified as contract/temporary employees. Two (1.7%) individuals were volunteers.

### ***Decedent's Activity at the Time of the Incident***

The activity of the decedent at the time of the fatality was identified for 96 (97.0%) of the 99 non-homicide/non-suicide related deaths. The activity of the decedent was unknown for three incidents.

The individual was the operator in 61 (63.5%) incidents, or a coworker directly involved in the work activity in 23 (24.0%) incidents. In seven (7.3%) incidents the decedent was a bystander or pedestrian.

In 31 (27.4%) incidents, the individual was working indoors and outdoors in 82 (72.6%) incidents. The work location of the decedent was unknown for eight incidents.

The decedent was working alone in 65 (63.7%) incidents and working with a coworker in 37 (36.3%) incidents. Whether the decedent was working alone or with a coworker could not be identified in nineteen incidents.

For the 13 homicide incidents, 6 (66.7%) victims were working alone and 3 (33.3%) victims were working with a coworker. Working alone or with a coworker could not be determined in four homicide cases.

## *Means of Work-Related Death*

Table 11 summarizes the 121 work-related fatalities by means of death. See the Appendix for a description of each death grouped by means of death.

Motor vehicle events accounted for 30 (24.8%) work-related fatalities in 2008. Twenty-six (21.5%) individuals died as a result of a fall from a height. Sixteen (13.2%) individuals died as a result of being struck by an object and 13 (10.7%) died as a result of a homicide. A machine was involved in 11 (9.1%) deaths. Nine (7.4%) individuals committed suicide while at their workplace. Electrocutions accounted for 5 (4.1%) deaths. Three (2.5%) individuals died as a result of a fire/explosion. Two (1.7%) individuals each died from drowning, a drug overdose, or a toxic exposure. One (0.8%) individual died when he was asphyxiated and 1 individual died as a result of contact with an animal.

### *Animals*

An animal was involved in one incident; a draft horse kicked an individual.

### *Asphyxiation*

One individual was asphyxiated when he was caught in a steel coil

### *Drowning*

One individual drowned as he as he was removing log barriers from a county drain's water control structure.

### *Drug Overdose*

Two individuals died as a result of a drug overdose. A painter died due to multiple drug toxicity of prescription medication and illegal drugs. One individual died due to a drug overdose that involved illegal drugs.

### *Electrocution*

Five individuals were electrocuted. All of the deaths involved contact with energized overhead lines or their transformers.

Three electrocutions were a result of indirect contact; one individual touched a crawler excavator that was in contact with a 7,200-volt overhead line, 1 person touched a raised roll-off container tilt frame in contact with a 7,600-volt overhead line, and 1 person either touched an energized truck due to a 7,200-volt laying across it or was in contact with the voltage gradient on the ground.

Two individuals had direct contact with an energized source; both contacted a 7,200-volt overhead line's energized transformers.

### *Fall*

There were 26 (21.5%) falls that resulted in a WR fatality in 2008. The reason for the fall was identified for 20 (76.9%) individuals. Six (30.0%) individuals slipped or tripped which contributed to their fall. In 3 (15.0%) incidents, the structure upon which the decedent was working collapsed/gave way. Two (10.0%) individuals had a medical condition that caused them to fall, but the injuries sustained as a result of the fall was listed as the cause of death. Two (10.0%) walked off the edge of a height. The following incidents were the cause of 1 (5.0%) individual falling: hit by a bridge crane, horse spooked while exercising, hose caught in a conveyor, ladder moved sideways, an unlit open shaft, unhooked fall harness, walked into a roof opening.

The distance the worker fell was identified in 16 (61.5%) of the 26 fall events. Three (18.8%) individuals fell less than 10 feet: 1 individual fell when she slipped on ice, 1 fell approximately 4 feet and 1 individual fell 8 feet. Four individuals fell from heights of 10-19 feet: 1 individual fell 11 feet, 2 individuals fell 14 feet, and 1 fell 15 feet.



## *Means of Work-Related Death, continued*

### ***Fall, continued***

Four (25.0%) incidents had falls between 20-50 feet: one 24-foot fall, two falls of approximately 35 feet, and one 40-foot fall. Five (31.6%) individuals had falls of 50 feet or higher: 1 fall each of 55 feet, 63 feet, 69 feet, 110 feet, and 250 feet.

The surface location from which the worker fell was identified for 22 (84.6%) of the 26 falls. Six (27.3%) individuals fell while working from a ladder or scaffold, 2 (9.1%) individuals each fell from a standing position on the ground, down an elevator shaft, or from a vehicle/machinery or other piece of equipment. One (4.5%) individual each fell from the following locations: a catwalk, an unguarded roof opening, a roof edge, structural steel, a tree, a cart pulled by a horse, roofing material, stairs, the top of a wall of a building under construction, and a TV antenna.

The surface to which the worker fell was identified for 19 (73.1%) of the 26 falls. Twelve (63.2%) fell to concrete, rock or asphalt, 2 (10.5%) individuals fell to a carpeted or tiled floor, 1 individual each (5.3%) fell to the following surfaces: loose soil, packed dirt, the roof of a pole barn, bricks and metal scrap at a construction site, and 1 (5.3%) individual, as he fell, first struck the bucket of a bucket truck and then landed on packed dirt.

The condition of the work surface the decedent fell from was known in 15 (57.7%) of the 26 fall incidents. The decedent fell from a dry working surface in 14 (93.3.0%) incidents. One dry surface was damaged (tree had been struck by lightning), and 1 dry surface was cluttered and not properly secured. On 1 dry surface, wind was determined to be a factor contributing to the fall. In one incident, the decedent was blowing coal dust. A wet working surface contributed to the fall in 1 (6.7%) incident.

Six (25.0%) incidents occurred at a commercial construction site, 4 (16.7%) occurred at a manufacturing facility, and 3 (12.5%) occurred at a retail store.

One (4.2%) incident each occurred at a residential construction site, an airport, a church, a college, a community center, a farm, a horse track, a mine-shaft, a restaurant and the yard of a home. The site of the incident was unknown for 2 individuals.

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

Three individuals died as a result of a fire or explosion. One individual was killed when he was burned by an arc flash, 1 individual died when the truck he was driving struck a cement barrier wall and exploded, and 1 individual died while repairing a coke oven pipeline.

### ***Homicides***

There were 13 WR homicides, a decrease of 7 work-related homicides compared to 2007. Twelve of the homicide victims were men and one was a woman. Ten (76.9%) homicide victims were Caucasian, and 3 (23.1%) individuals were African-American. Nine of the 12 men were Caucasian. The female victim was Caucasian.

The ages of the victims ranged from 21 to 66. The average age at the time of the incident was 40.5 years old. A gun was used in 11 (84.6%) homicides. One (7.7%) homicide was the result of blunt force head trauma, and for 1 (7.7%) homicide, the cause of death was blunt force trauma due to an instrument or as a result of a fall.

Four (30.8%) of the 13 individuals had worked in Retail Trade. Three (23.1%) victims worked in the Accommodation and Food Service. Two (15.4%) individuals worked in Public Administration. One (7.7%) individual each worked in Construction, Transportation and Warehousing, Real Estate and Rental and Leasing, and Administrative and Support and Waste Management and Remediation Services.



## Means of Work-Related Death, continued

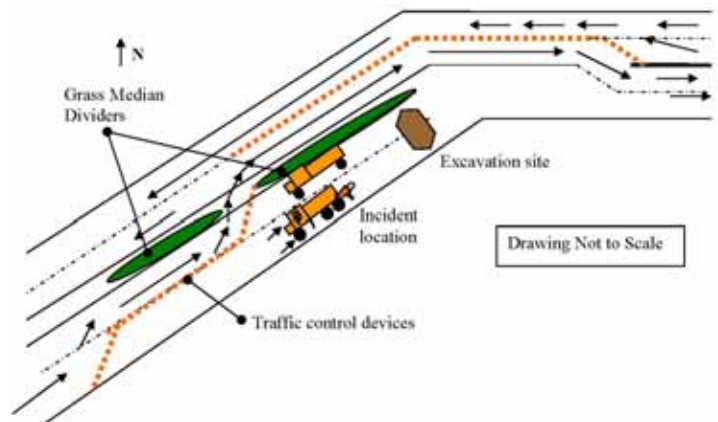
### Machine-Related Deaths

There were 12 machine-related fatalities. The leading cause of a machine-related death was being run over by the machine (5 incidents, 41.7%). Three of the 5 individuals who were run over by a machine (tractor) worked in Agriculture and 2 individuals worked in Construction (dump truck and bulldozer). Three (25.0%) individuals were killed as a result of an equipment overturn, pinning them under the overturned equipment. Two of the three individuals worked in Agriculture and were pinned under an overturned tractor. In Construction, 1 individual was pinned under an overturned bulldozer which fell from a trailer onto him. Two (16.7%) individuals were killed due to their clothing becoming entangled in a rotating piece of equipment; 1 individual worked in Manufacturing (drill bit) and 1 individual worked in Agriculture (exposed bolt on drive shaft). One (8.3%) individual was crushed between two bolster plates (Manufacturing) and 1 (8.3%) individual died of thermal burns caused by a ruptured metal jacket of a machine.

### Motor Vehicle Related Deaths

There were 30 motor vehicle related fatalities involving 27 motor vehicles in 26 incidents, accounting for nearly 25% of all work-related fatalities in 2008. There were 4 incidents where more than 1 person died; in 2 incidents, both the vehicle driver and passenger were killed, and in 1 incident, 2 pedestrians were killed by the same vehicle. In one incident, both truck drivers (driving separate vehicles) were killed. The driver of the vehicle was the individual killed in 17 (56.7%) of the incidents.

Ten (30.0%) pedestrians were killed when they were struck by a motor vehicle, and 3 (10.0%) individuals were passengers in a vehicle. One of the motor vehicle fatalities occurred in a construction zone; the decedent was a pedestrian run over by a backing dump truck.



*A truck driver died when he was struck by a backing dump truck at a sewer repair project. MIFACE Investigation Report 08MI040*

## 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 incident.

The crash type is based on the intended direction of travel, regardless of point(s) 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.
- ♦ **Sideswipe-opposite:** vehicles were traveling in opposite directions and they made a glancing side impact.
- ♦ **Rear End:** vehicles traveling in same direction, one behind the other and no turn is involved.
- ♦ **Angle:** direction of travel is basically perpendicular for both drivers and there is a side impact of approximately 90 degrees.

## *Means of Work-Related Death, continued*

### **HIGHLIGHTS OF MOTOR VEHICLE INCIDENTS**

- ◆ **Number of Units**
  - ◆ 2-unit: 15 (60.0%) incidents
  - ◆ Single-unit: 4 (16.0%) incidents
  - ◆ 3-unit: 4 (16.0%) incidents
  - ◆ 4-unit: 2 (8.0%) incidents
- ◆ **Type of vehicle**
  - ◆ Truck/bus: 12
  - ◆ Passenger cars: 4
  - ◆ Van: 3
  - ◆ Pickup truck: 2
  - ◆ ATV: 2
  - ◆ Farm equipment, motorcycle, race car, small truck (less than 10,000 pounds): 1 incident
- ◆ **Type of crash** identified in 22 incidents; 5 incidents were identified as other/unknown.
  - ◆ Single motor vehicle: 9 (40.9%) incidents
  - ◆ Angle: 5 (22.7%) incidents
  - ◆ Rear End: 4 (18.2%) incidents
  - ◆ Head On: 3 (13.7%) incidents
  - ◆ Sideswipe Opposite: 1 (4.5%) incident
- ◆ **Weather conditions** noted by the responding police agency in 24 (92.3%) of the 26 incidents.
  - ◆ Clear: 13 (54.2%) incidents
  - ◆ Cloudy: 8 (33.3%) incidents
  - ◆ Raining: 1 (4.2%) incident, and
  - ◆ Snow and/or blowing snow: 2 (8.3%) incidents
- ◆ **Roadway surface** was identified for 24 incidents
  - ◆ Dry: 21 (80.8%) incidents
  - ◆ Wet: 1 (3.8%) incident
  - ◆ Icy: 1 (3.8%) incident
  - ◆ Snowy: 1 (3.8%) incident
- ◆ **Amount of light** at the time of each crash was identified in 25 (96.2%) of the 26 incidents.
  - ◆ Daylight: 15 (60.0%) incidents
  - ◆ Dark, Unlit: 8 (32.0%) incidents
  - ◆ Dusk: 1 (4.0%) incidents
  - ◆ Lighted road at night: 1 (4.0%) incident
- ◆ **Number of lanes** of a roadway identified in 21 incidents; the number of lanes of a roadway was unknown for two incidents. The number of lanes was not applicable for three incidents: 1 motor vehicle incident occurred in a parking lot, 1 crash occurred at a raceway, and 1 incident occurred near a pasture gate.
  - ◆ 2-lane roads: 15 (62.5%) incidents
  - ◆ 3-lane roads: 3 (12.5%) incidents
  - ◆ 4-lane roads: 2 (9.5%) incidents
  - ◆ 8-lane roads: 1 (4.8%) incident
- ◆ **Speed limits** identified for 21 (91.3%) of 23 incidents where a speed limit was applicable; for three incidents (parking lot, raceway and pasture) a speed limit was not applicable.
  - ◆ 55 mph: 9 (42.9%) incidents
  - ◆ 70 mph: 7 (33.3%) incidents
  - ◆ 35 mph: 2 (9.5%) incidents
  - ◆ 30 mph, 40 mph and 60 mph: 1 (4.8%) incident each
- ◆ **Posting of speed limit signs** known in 21 (91.3%) of 23 incidents where posting was appropriate.
  - ◆ Posted: 18 (85.7%) roadways
  - ◆ Not posted: 3 (14.3%) roadways

**Since 2001, motor vehicle incidents have been the #1 cause of work-related deaths in Michigan.**

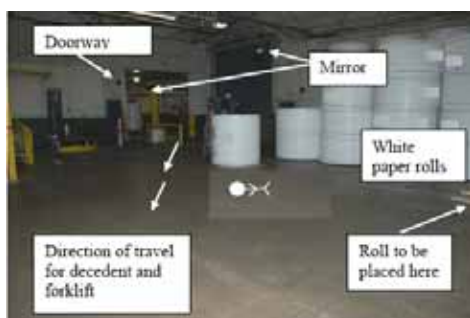
## *Means of Work-Related Death, continued*

- ◆ **Restraint system use** (seat belt/shoulder harness) identified by the responding enforcement agency for 14 (77.8%) of the 18 individuals who died and could have been using restraints (10 individuals were pedestrians, one individual was driving a motorcycle, and one individual was driving an ATV).
  - ◆ Wearing a lab/shoulder belt: 10 (71.4%) of the individuals (8 drivers and 2 passengers)
  - ◆ Unrestrained individuals ejected from their vehicle: 3 (75.0%)
- ◆ **Presence or absence of airbags** in the vehicle was identified for 14 of the 16 vehicles where the decedent was the driver or passenger. The presence or absence of an airbag was not applicable for the 10 pedestrian fatalities, the ATV or the motorcycle incident.
  - ◆ Airbag present: 11 (78.6%) of the vehicles and deployed in 6 (54.5%) incidents
  - ◆ No airbag present: 3 (27.3%) vehicles
- ◆ **Decedent information**
  - ◆ **Vehicle driver:** 17 (65.4%) of the 26 incidents
    - ◆ Driver condition:
      - ◆ Appeared normal in 6 (35.3%) incidents
      - ◆ Alcohol use might have contributed to 1 (5.9%) death
      - ◆ Unknown: 10 (58.8%) incidents
    - ◆ Driver determination of “fault” known for 15 of the 17 vehicle drivers.
      - ◆ Not “at fault”: 3 (20.0%) incidents
      - ◆ Disregarded traffic control devices: 5 (33.3%) incidents
      - ◆ Driving too fast: 2 (13.3%) incidents
      - ◆ Drove left of center: 1 (6.7%) incident
      - ◆ Unable to stop in an assured distance: 1 (6.7%) incident
      - ◆ Careless/negligent driving: 1 (6.7%) incident
      - ◆ Other: 2 (13.3%) incidents
- ◆ **Pedestrians: 10 incidents**
  - ◆ Two pedestrians killed in the same incident were struck by a gravel truck
  - ◆ One pedestrian was struck by a vehicle driven by an individual under the influence of alcohol
  - ◆ One pedestrian was killed when driver fell asleep and the vehicle left the roadway
  - ◆ One pedestrian each was struck by the following vehicles: Kubota RTV 900, backing dump truck, semi-truck on the highway, pick-up truck, automobile, and bus
- ◆ **Passenger: 3 incidents**
  - ◆ Driver condition described as normal in each incident
- ◆ **Type of collision** identified for 24 (92.3%) of the 26 motor vehicle incidents.
  - ◆ **Non-collision: 2 (8.3%) incidents**
    - ◆ Cargo shift caused the driver to lose control of the vehicle
    - ◆ Driver drove vehicle into an area of a road collapse
  - ◆ **Collision with non-fixed object: 19 (79.2%) incidents**
    - ◆ Moving motor vehicle in transport: 9 (47.3%) incidents
    - ◆ Pedestrian: 9 (47.3%) incidents; 1 incident involved 2 pedestrians
    - ◆ Struck railroad train: 1(5.3%) incident
  - ◆ **Collisions with a fixed object: 3 (12.5%) incidents**
    - ◆ Tree: 1 (33.3%) incident
    - ◆ Brick wall: 1 (33.3%) incident
    - ◆ Racecourse embankment: 1 (33.3%) incident.

## *Means of Work-Related Death, continued*

### ***Struck By***

Sixteen individuals were fatally injured when an object struck them. Two (12.5%) incidents involved the decedent being struck by a tree. The following 14 objects each struck 1 (6.3%) individual: falling bricks, corn elevator, 200# piece of Styrofoam, vehicle while attempting to jump start, crane load, dump truck box, end cap of a paper roll, engulfment by grain in a rail car, hit by a pole while elevated in a bucket truck, falling loading dock ramp, pinned by a roof beam, pipes, truck rolled over the decedent and pinned between a truck and a dock wall.



*A traffic supervisor was walking through a warehouse when he was struck by a clamp truck carrying a paper roll. MIFACE Investigation Report 08MI010.*

### ***Suicide***

Nine individuals committed suicide while at their workplace. Five individuals died from a self-inflicted gunshot wounds and four individuals died from a self-inflicted hanging.

### ***Toxic Exposure***

Two individuals died due to a toxic exposure while working. One individual died from complications after inhaling a soy-based lubricating oil at a machining operation. One individual was overcome by a low-oxygen environment after entering a controlled atmosphere storage room.

## *MIOSHA Fatality Investigations*

For each company that had a work-related fatality, the Federal OSHA Integrated Management Information System (IMIS) was accessed to determine the previous MIOSHA compliance activity at the company. The IMIS database identified that 23 employers, whose work activity was considered in-scope for a MIOSHA inspection, had a work-related compliance inspection prior to 2008.

Of the 121 work-related fatalities at 119 employers in 2008, MIOSHA personnel conducted an on-site compliance investigation for 37 (30.6%) fatalities.

Five of the 23 employers had a prior work-related fatality, four of the fatalities were investigated by MIOSHA (one 2006 fatality was a motor vehicle incident not investigated by MIOSHA).

In 2001, a lineman was struck by a falling utility pole. In 2004, a worker was struck by a crane. In 2006, a road commission worker was struck by a falling tree, and in 2007, a fire fighter, whose fire truck was struck by a speeding vehicle while en-route to a fire, was not wearing his vehicle restraints.

## *MIOSHA Fatality Investigations, continued*

- ◆ Seven of the 24 companies were inspected by MIOSHA prior to 2003
  - ◆ Occupational Health Division: 5 companies
  - ◆ General Industry Safety Division: 2 companies.
- ◆ Six companies had a compliance inspection both prior to and after a 2003 MIOSHA reorganization.
  - ◆ Occupational Health Division inspection prior to the reorganization and a General Industry Safety and Health Division inspection after the reorganization: 2 companies.
  - ◆ Occupational Health Division inspection prior to the reorganization and a Construction Safety and Health Division inspection after the reorganization: 3 companies.
  - ◆ General Industry Safety Division inspection prior to the reorganization and a Construction Safety and Health Division inspection after the reorganization: 1 company.
- ◆ Twenty (87.0%) of the 23 previously inspected companies had a MIOSHA compliance inspection after the 2003 reorganization.
  - ◆ General Industry Safety and Health Division compliance inspection: 9 companies.
  - ◆ Construction Safety and Health Division compliance inspection: 8 companies.
  - ◆ General Industry Safety and Health and Construction Safety and Health Division compliance inspection: 3 companies.

**Depending upon the work being performed, a company will be inspected by the applicable MIOSHA compliance division.**

**Prior to October 2003, MIOSHA had 3 compliance divisions; Occupational Health, General Industry Safety, and Construction Safety.**

**In October 2003, MIOSHA reorganized the compliance divisions to 2 divisions; the General Industry Safety and Health Division and the Construction Safety and Health Division.**

## *Hispanic Initiative*

The US Department of Labor, Bureau of Labor Statistics (BLS) has analyzed the Census of Fatal Occupational Injury (CFOI) data and reported a higher fatal work injury rate for Hispanic workers than for other racial/ethnic groups. As a result, Federal OSHA is currently collecting additional information during all investigations that includes the primary language and country of origin of the decedent. OSHA has also formed the Hispanic Worker Task Force that includes hazard awareness and workplace rights.



## *Hispanic Initiative, continued*

In partnership with Federal OSHA, NIOSH has added fatalities among Hispanic workers to the list of current targets for the Federal in-house FACE program. Information gathered will be made available to the OSHA Hispanic Worker Task Force. The MIFACE program has supported this initiative and have utilized an Immigrant Workers/Limited English Speakers Workers investigation guide, which was developed in conjunction with the other FACE states.

There were 7 deaths of Hispanic workers in Michigan in 2008. Five of these 7 individuals were between the ages of 16-65. Using the United States Census Bureau population estimates for the Caucasian, African-American, and Hispanic populations in Michigan for 2007, this was a rate of 2.33/100,000 for 16-65 year-old Hispanics as compared to a rate of 1.6115/100,000 for 16-65 year-old Caucasians and 1.60/100,000 for 16-65 year-old African-Americans.

Industries in which Hispanic deaths occurred in 2008:

- ◆ Agriculture: 2 Hispanics
  - ◆ motor vehicle crash
  - ◆ tractor overturn
- ◆ Construction: 2 Hispanics
  - ◆ struck by a backing dump truck
  - ◆ fell from a roof in 1995.
- ◆ Retail Trade: 1 Hispanic
  - ◆ homicide
- ◆ Administrative and Support and Waste Management and Remediation Services: 1 Hispanic
  - ◆ motor vehicle crash.
- ◆ Accommodation and Food Services: 1 Hispanic
  - ◆ slipped and fell on an icy surface

One company employing a Hispanic worker who died in 2008 agreed to participate in the MIFACE research program in 2009. One firm declined and MIFACE did not contact 5 companies (2 motor vehicle incidents, 2 falls, and 1 homicide).

## *Case Narratives*

For 2008, MIFACE requested, received permission, and conducted a work-related fatality investigation at 16 facilities. Copies of the MIFACE Investigation Reports and MIFACE Summaries of MIOSHA Inspections (Summary), which include the MIOSHA citation(s) issued at the MIOSHA/employer closing conference can be found on the MSU OEM website: [www.oem.msu.edu/](http://www.oem.msu.edu/).

A brief narrative summary of each of the 121 work-related deaths occurring in 2008 is contained in the Appendix. Each narrative summary was based on the information collected during the MIFACE on-site investigation and/or from source documents. Each narrative has a case number and are organized alphabetically by means of death.

Table 13 gives the narrative case number and means of death by NAICS code.

When a brand name of equipment was known, MIFACE included this information in the narrative; unless noted, this does not signify that there was a defect or other problem with the machine.

## Case Narratives, continued

**Table 13. Case Narrative Number by Means of Death and Industry Sector, Michigan 2008**

Industry Sector (NAICS Code)	Narrative Case Number	Industry Sector (NAICS Code)	Narrative Case Number	Industry Sector (NAICS Code)	Narrative Case Number
<b>Agriculture, Forestry, Fishing, &amp; Hunting (11)</b>		<b>Wholesale Trade (42)</b>		<b>Educational Services (61)</b>	
Animal	1	Motor Vehicle	70, 71	Fall	31
Drowning	3	Struck By	100	<b>Health Care &amp; Social Assistance (62)</b>	
Fall	11, 12	<b>Retail Trade (44-46)</b>		Motor Vehicle	81, 92
Machine	53-58	Fall	27, 28	<b>Arts, Entertainment &amp; Recreation (71)</b>	
Motor Vehicle	65, 66	Homicide	41-44	Fall	32, 33
Struck By	91, 92	Motor Vehicle	72	Motor Vehicle	83
Suicide	107	Suicide	111, 112	<b>Accommodation &amp; Food Service (72)</b>	
Toxic Exposure	116	<b>Transportation &amp; Warehousing (48-49)</b>		Fall	34
<b>Mining (21)</b>		Fire/Explosion	39	Homicide	48050
Motor Vehicle	67	Homicide	45	Suicide	113, 114
<b>Utilities (22)</b>		Motor Vehicle	73-77	<b>Other Services (Except Public Administration) (81)</b>	
Electrocution	6	Struck By	101-103	Fall	35, 36
<b>Construction (23)</b>		<b>Finance and Insurance (52)</b>		Motor Vehicle	84-87
Drug Overdose	4	Motor Vehicle	69	Struck By	105
Electrocution	7-9	<b>Real Estate &amp; Rental &amp; Leasing (53)</b>		<b>Public Administration (92)</b>	
Fall	13-23	Homicide	46	Homicide	51, 52
Fire/Explosion	37	Motor Vehicle	79	Motor Vehicle	84-87
Homicide	40	<b>Professional, Scientific &amp; Technical Services (54)</b>		Struck By	106
Machine	59, 60	Fall	29	Suicide	115
Motor Vehicle	68	Motor Vehicle	79		
Struck By	93-97	<b>Administrative &amp; Support &amp; Waste Management &amp; Remediation Services (56)</b>			
Suicide	108-110	Electrocution	10		
<b>Manufacturing (31-33)</b>		Fall	30		
Asphyxiation	2	Homicide	47		
Drug Overdose	5	Motor Vehicle	80		
Fall	24-26	Struck By	104		
Fire/Explosion	38				
Machine	61-64				
Motor Vehicle	69				
Struck By	98, 99				
Toxic Exposure	117				



*A male farmer, who was a member of a volunteer cooperative drowned, as he was removing wood stop logs from the drain's water level control structure to relieve a high upstream water level. MIFACE Investigation 08MI135*



*A male laborer was asphyxiated when he entered a controlled atmosphere storage room.*

## *Number of Deaths for 2008 Compared to the Michigan Census of Fatal Occupational Injuries (CFOI) Data*

The Census of Fatal Occupational Injuries (CFOI) is the surveillance system funded in every state by the United States Department of Labor Bureau of Labor Statistics (BLS). CFOI reported 123 deaths in 2008 per the BLS website viewed on December 17, 2008 ([www.bls.gov/ro5/cfoimi.htm](http://www.bls.gov/ro5/cfoimi.htm)).

The difference in the determination that a death was work-related was due to the interpretation of the available information.

MIFACE counted one death as work-related that Michigan CFOI did not consider a work-related death (exposure to soy-based lubricating oil at his workplace with a subsequent hospitalization and death from complications).

MIFACE did not count three deaths where an individual died in a fire, where an individual was killed outside his home, and where an individual was trimming trees and bushes in his backyard.

## *Discussion*

There were 121 traumatic work-related fatalities in Michigan in the year 2008, averaging 2.3 traumatic work-related fatalities per week. The major sources for identifying traumatic work-related deaths were the 24-hour MIOSHA hotline, a newspaper clipping service, the State Police vehicular data reporting system, and death certificates. The 2008 annual fatality rate (per 100,000 workers) in Michigan was 3.0 per the MIFACE statistics. Since MIFACE began surveillance of all traumatic work-related fatalities in 2001, 3.0 deaths/100,000 workers is the second lowest fatality rate MIFACE has reported for Michigan.

Individuals who died from a traumatic work-related fatality were most likely to be men (91%), white (82%), married (56%) and had received a high school diploma (47%). The average age of death was 48.7 years ranging from 16 to 91. The largest number of deaths occurred in Construction (28, 23.1%).

## Discussion, continued

Construction and Agriculture (16, 13.2%) had the highest risk of a traumatic work-related fatality (18.7 deaths/100,000 workers). Mining had a traumatic work-related fatality rate of 15.7/100,000 workers and then Transportation and Warehousing with 11.0/100,000 workers (Table 9).

Among the non-suicide/non-overdose deaths, a total of 14 of 110 (12.7%) individuals had alcohol, illegal drugs, or prescription medications in their system at levels that may have been a risk factor for the occurrence of the traumatic injury.

MIOSHA staff investigated 37 of the deaths at 37 employers. The police investigated 51 of the deaths (motor vehicle, homicides and suicides, drug overdose, etc.) at 56 different employers. The Federal Railroad Administration investigated 1 death. The remaining 32 work-related fatalities were not investigated by any regulatory agency as to cause of death other than by the police to exclude a homicide or suicide.

### MIFACE Contact with Employers and Families

MIFACE is a research effort and relies on the voluntary cooperation of employers and for the self-employed, their family members.

MIFACE contacted 60 of the 119 employers asking for their participation in the MIFACE program. Forty employers declined to participate.

MIFACE contacted 36 of the 37 employers whose work-related fatality was investigated by MIOSHA staff; the 37th fatality was incurred by an out-of-state employer. Of these employers, 21 declined to participate, 11 agreed to participate, and 4 employers asked MIFACE to contact them at a later date for possible participation. Among the other 24 employers or next of kin contacted, 5 agreed to participate. In total, sixteen employers agreed to participate and a MIFACE investigation was initiated.



*A male laborer in an automobile repair shop died when both he and the Kawasaki Tecati Model XF 250 four-wheel all-terrain vehicle (ATV) he was test driving in the parking lot struck a concrete wall*

**Despite the high fatality rate in Agriculture, farms with fewer than 11 employees are exempted from routine MIOSHA inspections.**

**Since 2001, Agriculture has ranked as one of Michigan's most hazardous industries.**



## Discussion, continued



**MICHIGAN**

**Prevention through comprehensive research and investigation**

**INVESTIGATION/RESEARCH**      **CO: WHAT YOU CANNOT SMELL CAN KILL YOU**

Since 2001, 10 workers have died in Michigan from exposure to carbon monoxide (CO). CO is a colorless, odorless gas that can quickly build up to a lethal concentration. Exposure to high levels of CO can cause unconsciousness, coma, and death. Recent fatalities due to CO exposure include:

- 70-year-old church security guard died from CO poisoning from an indoor generator.
- 45-year-old farmer died from CO poisoning while repairing a tractor in a barn from tractor exhaust.
- 47-year-old painter spraying water-based latex paint died from CO poisoning in a manufacturing plant from a propane-powered snorkel lift.
- 40-year-old construction company owner died from CO poisoning at a construction site from a portable propane space heater.

**IN ORDER TO PREVENT SIMILAR INCIDENTS IN THE FUTURE**

- **Provide training** to recognize CO sources and signs and symptoms of CO exposure.
- **Identify all sources of combustion** because all emit CO gas.
- **Install a CO detector/alarm** meeting the requirements of the current UL standard 2034 or the IAS 5-95 standard in areas where fuel-burning equipment/appliances are present.
- **Ensure a trained professional** annually inspects and services fuel-burning equipment and appliances, such as an oil or gas furnace, gas hot water heaters, or portable compressors. When measuring tailpipe exhaust of LPG forklifts to minimize CO output, **use a CO analyzer** specifically designed for that purpose.
- **Use tools powered by electricity or compressed air** approved for indoor use when working indoors.
- **Place gasoline- or fuel-powered equipment** outdoors and away from windows, doors or vents. CO could enter the building through the openings and build up in the work area.
- **If gasoline- or fuel-powered equipment must be used indoors or in enclosed or partially-enclosed spaces**, such as houses, garages, crawl spaces and basements, **vent equipment** exhaust outdoors and away from air intakes such as doors, windows or fresh air vents. **Provide supplemental fresh air** inside the building because even with doors and windows open, CO levels can reach lethal levels in a short period of time.

**DID YOU KNOW?**

- Common sources of CO exposure in the workplace include generators, pressure washers, propane-powered forklifts, propane space heaters, and compressors.
- You cannot rely on smell to detect CO.
- Symptoms of CO poisoning are hard to recognize because they may mimic flu symptoms (but without the fever). CO poisoning symptoms include: tightness in chest, shortness of breath, headache, vomiting, dizziness, and muscle weakness.
- People exposed to CO who have preexisting heart disease or hardening of the arteries are at increased risk of having a heart attack or stroke.
- CO poisoning can cause permanent damage to organs, such as the heart and brain that require a rich supply of oxygen.

**MIFACE Investigation Report #08MI204:**  
Security Guard Dies Due to CO Poisoning.  
[www.oem.msu.edu](http://www.oem.msu.edu)  
**MIOSHA: Carbon Monoxide.**  
[www.michigan.gov/documents/cis\\_wsh\\_cot5010\\_90097\\_7.doc](http://www.michigan.gov/documents/cis_wsh_cot5010_90097_7.doc)  
**MIOSHA: Carbon Monoxide Hazards from Internal Combustion Engines.**  
[www.michigan.gov/documents/cis\\_wsh\\_cot5011\\_115670\\_7.doc](http://www.michigan.gov/documents/cis_wsh_cot5011_115670_7.doc)  
**WAYNE STATE UNIVERSITY: CO**  
Headquarters: [www.coheadquarters.com](http://www.coheadquarters.com)      **HA #18 10/25/07**

**TO REPORT A NEW WORKPLACE FATALITY TO MIOSHA**  
**1.800.858.0397**

**MICHIGAN FATALITY ASSESSMENT & CONTROL EVALUATION**  
INFORMATION: 1.517.353.1846  
E-MAIL: [alecia.chester@tuma.edu](mailto:alecia.chester@tuma.edu)

### Prevention Material Dissemination

On MSU OEM web site, ([www.oem.msu.edu/](http://www.oem.msu.edu/)) are copies of the completed MIFACE Investigation Reports, Hazard Alerts, and MIFACE summaries of investigations conducted by the MIOSHA program.

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 (e.g. trench wall cave-ins).

MIFACE summaries of investigations conducted by the MIOSHA program include a summary of the work-related fatality incident and the citations issued to the employer by MIOSHA at the conclusion of the fatality investigation.

For each MIFACE Investigation Report and Hazard Alert there is a dissemination plan to maximize awareness of the Report and Hazard Alert. Investigation Reports and Hazard Alerts are sent to appropriate trade associations, unions, trade journals and in some cases other employers doing the same type of work.

### Example of Intervention

MIFACE sent a copy of MIFACE Investigation Report #08MI135: *Farmer Drowned While Removing Stop Logs From Water Level Control Structure* to each County Drain Commissioner to raise awareness of the potential hazards in water level regulation. The mailing included a Report Evaluation form. One County Drain Commissioner returned the form with the following comment: "4 of our 7 lake level control structures are regulated by volunteers for our office. I have never thought about an accident like this. I will now set some guidelines to ensure their safety while helping us out. Thank you."

**Most of 121 deaths in this report could have been prevented. An awareness of the hazards of one's job, the provision of safe equipment, and an attitude of safety-mindedness on the part of labor and management are critical to prevent future fatal events.**

## *Discussion, continued*

There was an increase of one work-related death in 2008 compared to 2007. Several industry sectors had an increased number of deaths compared to 2007: Construction (+10); Finance and Insurance (+1); Mining (+1); Real Estate and Rental and Leasing (+1); Professional, Scientific and Technical Services (+1); Arts, Entertainment and Recreation (+1); Accommodation and Food Services (+1).

Industrial sectors showing a decrease in the number of deaths compared to 2007 were: Agriculture (-3), Wholesale Trade (-1), Administrative and Support and Waste Management and Remediation Services (-5), Educational Services (-1), Health Care and Social Assistance (-3), Other Services (-1), and Public Administration (-2). Manufacturing, Retail Trade and Transportation and Warehousing had the same number of deaths as 2007. Information, which had 5 deaths in 2007 did not have a work-related fatality in 2008.

We are unable to explain the relatively large variations in deaths noted in certain industries. For example, in Construction, there were 32 deaths in 2004, 23 deaths in 2005, 42 deaths in 2006 and 18 deaths in 2007 and 28 deaths in 2008. In Agriculture, there were 33 deaths in 2003 when in the years before and after 2003 the number of deaths have ranged from 13-21. An explanation for these variations might provide insights into preventing future deaths.

Nationally, a preliminary total of 5,071 fatal work injuries were recorded in the United States in 2008, down from a total of 5,647 fatal work injuries reported in 2007<sup>2</sup>. BLS indicated that economic factors likely played a role in the decrease in the number of fatalities. Thirty-five states and the District of Columbia reported lower numbers of work-related fatalities. Contrary to national statistics, the CFOI data for Michigan and 13 other states reported a higher number of deaths. One state's number of deaths was unchanged from 2007. Michigan CFOI reported 123 deaths for 2008 and MIFACE reported 121 deaths.

BLS changed the methodology for calculating work-related fatality incidence rates in 2008. Instead of using employment-based fatality rates as in the past, BLS utilized hours-based fatality rates. BLS noted the 2008 annual national fatality rate, 3.6 deaths/100,000 *full-time equivalent workers* was down from the final rate of 4.0 in 2007 and 4.2 in 2006. The 2007 and 2006 *employment-based* rates were 3.8/100,000 and 4.2/100,000 respectively. BLS cautions that hours-based fatality rates should not be directly compared to employment-based rates because of the differences in the numerators and denominators in the calculation. BLS did not calculate a national employment-based rate for 2008. MIFACE could not calculate an hours-based rate for Michigan for 2008 due to insufficient data from the Michigan Office of Labor Market Information. Michigan's employment-based rate has regularly been less than the national rate (Michigan: 2006-3.9, 2007-2.9, 2008-3.0).

**Traumatic occupational fatalities are an important public health issue in Michigan as they are throughout the United States.**

**Understanding the root cause of these tragic events and then sharing that information with stakeholders - from individuals to groups - is what makes these efforts worthwhile.**

**If what we learn from any of these deaths can help prevent another death, then the surveillance program has been successful in its goal.**

## *Discussion, continued*

A special effort in conjunction with the Michigan Farm Bureau to provide educational sessions to farmers is ongoing. In 2008, more than 750 individuals attended the training sessions.

Traumatic occupational deaths are not random events. Information about the settings and circumstances in which work-related deaths occur is necessary to prevent their occurrence in the future.

An awareness of the hazards of one's job, the provision of safe equipment, and an attitude of safety-mindedness on the part of labor and management are critical to prevent future fatal events. All of these factors would be useful in reducing the even larger burden of nonfatal traumatic work-related injuries.

## *Acknowledgement*

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

## *References*

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2. U.S. Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries. Internet Address: <http://www.bls.gov/>
3. Standard Occupational Classification Manual: 2000. U.S. Office of Management and Budget. Lanham, MD: Bernan Press; and Springfield, VA: National Technical Information Service. Internet Address: [www.bls.gov/soc/](http://www.bls.gov/soc/)
4. Michigan Department of Energy, Labor and Economic Growth, Office of Labor Market Information, Industry Employment (Establishments-CES) (IES), for the year 2008. Internet Address: [www.milmi.org/cgi/dataAnalysis/](http://www.milmi.org/cgi/dataAnalysis/)
5. Bureau of Labor Statistics, Injuries, Illnesses, and Fatalities, Census of Fatal Occupational Injuries – Hours-Based Rates. Internet Address: <http://www.bls.gov/iif/oshnotice10.htm>



*A male machinist died when he contacted and then his clothing became entangled in the rotating vertical cutting head of a gantry mill.*

## APPENDIX

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### ANIMAL (1)

#### *Agriculture*

**Case 1** A 63-year-old male pipefitter was killed when a horse kicked him while he was assisting at his son's farm. He was shaving the legs of a draft horse when the horse kicked him in the head.

### ASPHYXIATION (1)

#### *Manufacturing*

**Case 2** A 49-year-old male supervisor at a steel-processing firm died when a 3/4-inch steel wire coil weighing 2987 pounds and measuring 3.5 feet tall by 3 feet wide became uncoiled after he cut or removed a piece of banding that was holding it together. The coil of wire was banded at a compactor and transported via forklift to a staging area. The forklift operator set the coil on the floor and noted its condition to ensure that the

### **2008 Work-Related Fatality Case Narratives by Means of Death**

A case narrative may reference an MIFACE Investigation Report (MIFACE Investigation) or a Summary of MIOSHA Investigation (MIFACE Summary) that is posted on the MSU OEM website.

To access the referenced MIFACE Investigation or MIFACE Summary, click on the MIFACE link on the MSU OEM website homepage, and then click on the MIFACE Investigation or MIFACE Summary tab.

Each case narrative with a referenced MIFACE Investigation or MIFACE Summary, has at its conclusion, the MIFACE Investigation number or MIFACE Summary Case number. The industry to select in the Industry drop down menu is the industry heading under which the narrative is placed.

The Fatality Type drop down menu selection is the cause of death (e.g. fall, motor vehicle, struck by, etc.). After selecting the appropriate industry and fatality type, click the Search button, and then scroll down the page to the appropriate reference.



bands had not slipped or moved and that the coil had not opened. The forklift left the staging area. The decedent noted some loose bands on the coil. In violation of company policy, the decedent entered the uncontrolled coil while it was setting on the floor to remove the loose bands. Another employee who had entered the staging area noted the opened coil and called for help to re-band the coil. When the two employees were raising the coil with a forklift, the decedent's hard hat fell to the ground. The decedent was found inside of the coil. Reference: MIFACE Summary Case 191.

## **DROWNING (1)**

### ***Agriculture***

**Case 3** A 76-year-old male farmer, who was a member of a volunteer cooperative, drowned as he was removing wood stop logs from the drain's water level control structure to relieve a high upstream water level. The structure had three sections six feet wide. Each section had at its base, one 12-inch wide wooden stop log that was turned on its edge. Stacked on top of the 12-inch stop log were four 8-inch wide stop logs, also turned on their edge. The five stop logs were held in place by a channel in the concrete piers. At the time of the incident, each section had its full complement of stop logs. A large amount of precipitation and the area's soil composition caused water to run off to the field's drainage ditches and into the county drain resulting in high upstream water levels in the drain and ditches and field flooding. The decedent arrived at the water level control structure, parked his vehicle, removed his work boots, and donned chest waders. He stood downstream in the southernmost section and used a crowbar to loosen the top stop log. He lifted the top stop log up and out of the channel. After removing the stop log from the channel, he either slipped and lost his balance or was knocked over by the force of the water rushing over the remaining stop logs. A nearby landowner saw the decedent's unattended vehicle, and when he couldn't find him, called for emergency response. The police arrived, and called for the dive team. The decedent, who was not wearing a life jacket, was found 40 feet downstream, caught by low hanging tree branches. Reference: MIFACE Investigation 08MI135.

## **DRUG OVERDOSE (2)**

### ***Construction***

**Case 4** A 43-year-old male self-employed painter died due to intoxication from multiple drugs. The decedent was found in his truck by his coworker in the driveway at a painting worksite. The coworker stated in the police report that the decedent was not feeling well and left to go to his truck to rest.

### ***Manufacturing***

**Case 5** A 41-year-old male laborer died due to intoxication from multiple drugs.

## **ELECTROCUTION (5)**

### ***Utilities***

**Case 6** A 57-year-old male supervisor/foreman/lineman for an electric cooperative died when he contacted a 7,200-volt live electric line. He had been assigned to repair a non-responsive service meter at a seasonal resi-

dence. He found that a fuse in a nearby energized can arrester that was fastened to the side of the transformer on a pole had blown. It appears that he first attempted to use an "extendo" hot stick to initiate repairs from the ground, but could not dislodge the fuse from its mount. He donned his climbing spurs and pole climbing belt, but did not wear a pair of lineman's gloves. In his back pocket of his pants was a 2mm amp fuse. He proceeded to climb up the pole to approximately 40 feet. It appears he contacted the energized can arrester with both palms of his hands. Marks on the pole made by his climbing gear indicated that he had climbed to within approximately 5 feet of the fuse box. It appears he slid down the pole approximately 25 feet after contacting the electric line. When he did not return to the cooperative office, his coworkers searched for him. They found him approximately five hours after the end of his shift at the bottom of the pole, in a seated position, slumped to the right on the ground with all of his climbing harness equipment in place and still attached to the pole. His hot stick was hanging on/over a wire on the pole and his approved high voltage gloves were found in the company-issued truck. The fuse was unchanged in the transformer. Reference: MIFACE Summary Case 200.

### ***Construction (Cases 7-9)***

**Case 7** A 47-year-old male journeyman lineman/foreman was electrocuted during the installation of a new 15 KV switch suspended from a wood pole for a single phase, 7,200-volt overhead power line. The decedent was working from an insulated aerial bucket. He had not de-energized the can arrester fastened to the side of the transformer. He had removed his lineman's gloves prior to removing the first lower bolt of the arrester. His coworkers believe the can arrester tipped and the decedent attempted to catch it with his right hand. The current passed through his right hand, across his chest and exited his left hand, which was in contact with a second energized conductor. The decedent yelled to his ground man to lower the bucket. When the bucket was lowered, the decedent was still breathing, but unconscious. The ground man yelled to a two-person journeyman line crew working approximately 200 yards away to come over to help lift the decedent from the bucket. After taking the decedent out of the bucket, the crew began CPR while the ground man called his supervisor for assistance. The supervisor called for emergency response. Arriving six minutes later, the emergency response personnel took over medical care, and then transported him to a local hospital where he was declared dead. Reference: MIFACE Investigation 08MI037.

**Case 8** A 44-year-old male construction laborer was electrocuted when he contacted an energized crawler excavator. The decedent was a member of a two-person work crew; the foreman was at another location at the worksite. The firm was installing a large sewer line for a city and had been on this project for approximately eight weeks. The firm's employees had been made aware of and trained to keep equipment at least 10 feet from the energized 7,200-volt overhead lines. On the day of the incident, a shipment of 10-foot by 10-foot square pipe had arrived. To permit other businesses to access to the roadway, the pipe material was unloaded and placed under the 7,200-volt energized line. During the truck unloading process, the short lifting cables that were attached to the pipe and used to lift and place the pipe into the excavation were pushed to the backside of the pipe. Because the cables were not in a position to be used to lift/place the pipe into the excavation, the decedent located some chain and attached it to the cables so the excavator could be used to reposition them for use. The decedent signaled the crawler excavator operator to bring the bucket of the excavator toward him so he could attach the chain/cables to the bucket hook. The excavator operator positioned the bucket according to the signals the decedent was giving him. The excavator operator relied on the decedent's signals because the excavator boom arm was blocking his view of the overhead line. When the boom/bucket was in the final position as indicated by the decedent, the boom was in contact with or within arcing distance of the 7,200-volt line. When the decedent placed the chain onto the excavator's bucket hook, he became a path to ground and was electrocuted. The excavator operator immediately moved the boom

away from the overhead line. Emergency response was called and the decedent was transported to a local hospital where he died. Reference: MIFACE Summary Case 185.

**Case 9** A 43-year-old male concrete poured wall construction company owner was electrocuted while attempting to extinguish a truck's tire fire caused by an energized 7,200-volt power line lying on the truck. The truck's 18-foot long boom was improperly stowed and secured. The decedent, as he was driving from a construction site, entered the road from a dirt driveway. The truck cab was in the road when the boom snagged a cable TV line, causing the power pole carrying a 7,200-volt voltage line to snap. The electrical line came down on the truck behind the truck's crane. The decedent backed the truck to disentangle the boom. The electric current from the high voltage line blew out two truck tires and initiated a fire. The decedent, apparently unaware that the boom was still in contact with the overhead line, jumped out of the cab on the driver's side with a fire extinguisher. The driver's side had a dry gravel surface. He ran with a fire extinguisher in hand to the passenger side, which had wet, dewy grass. At some point, the decedent was electrocuted. It is unknown whether the decedent made direct contact with the energized truck or whether he came into contact with the voltage gradient caused by the downed line. The fire extinguisher was found lying next to him on the grass. Reference: MIFACE Summary Case 198.

### ***Administrative & Support & Waste Management & Remediation Services***

**Case 10** A 45-year-old male truck driver for a roll-off container company was electrocuted when the tilt frame he had raised to load a full 40-cubic-yard roll-off container contacted energized 7,600-volt overhead power lines. He had deposited the empty 8-foot-high x 8-foot-wide x 22-foot-long roll-off container at the customer's property several days earlier. The decedent was dispatched to remove the full container from the property. He stood on the frozen ground holding the trailer's tilt frame lift controls in position to raise the tilt frame to load the full container onto the trailer. The controls were located near the front of the driver's side of the trailer. The tilt frame could extend to a height of approximately 31 feet above the ground. The overhead lines contacted were 29 feet 3 inches above the ground. When the tilt frame contacted the overhead wires, electrical current moved through the decedent's body from his left hand to ground through his left foot. The property owner was leveling scrap in the container while the decedent was raising the tilt frame. The property owner noticed a small brush fire at the end of the trailer. He jumped from the container and upon contact with the ground he felt a "tingle." He investigated further and saw that all the trailer tires were smoking. As he looked towards the driver's side cab of the truck he could see the decedent lying on the ground. Because of the fire, he moved the decedent away from the truck into a nearby wooded area and called 911. Emergency response arrived, and the decedent was declared dead at the scene. Reference: MIFACE Investigation 08MI005.

## **Falls (26)**

### ***Agriculture***

**Case 11** A 91-year-old male horse trainer died from injuries sustained while exercising his horse on a horse track. The decedent was riding in a two-wheel "jog bike" or sulky pulled by a single horse. As the horse went around the track, the horse spooked and veered off of the track. The horse then veered back towards the track, causing the cart to go up on one wheel and tip over. The decedent was thrown to the ground. A witness grabbed the horse and took it to the barn. After he secured the horse, the witness saw that the decedent had not gotten up from the ground. He yelled to the decedent. When he saw no movement from the decedent, he ran to his truck, and drove to the decedent's location. Upon seeing the decedent's condition, he called for emergency response.

**Case 12** A 83-year-old male farmer died as a result of a fall of unknown height from a ladder that he placed against a barn wall. The barn roof had been damaged by a wind storm. It appears that the decedent had fallen either from the ladder or the barn's roof. The responding police department found a hammer and crowbar between his resting location and the barn.

### ***Construction (Cases 13-23)***

**Case 13** A 70-year-old male self-employed repair serviceman died of injuries sustained from a 40-foot fall from a residential television antenna to the roof of a pole barn. The decedent was repairing the antenna. The day was windy. A witness to the incident stated to the responding police department that the decedent had unfastened his safety harness which had secured him to the antenna. He began to climb down the antenna and lost his grip as he began his descent.

**Case 14** A 24-year-old male construction worker for a demolition company died after falling 189 feet down an elevator shaft as he was attempting to untangle an air compressor hose. The decedent and his coworker had completed the demolition of the elevator shaft, leaving four metal rails 48-inches in height as tie off points and as posts for a guardrail system around the open shaft. Three of the four sides of the elevator shaft were unprotected. The decedent and his coworker were in the process of moving equipment to another floor. The decedent, who was wearing a safety harness but had not connected to a lanyard, was walking backwards stretching the air hose. The employer required a 100% tie-off in this work area. The decedent was declared dead at the scene. Reference: MIFACE Summary Case 205.

**Case 15** A 55-year-old male electrician died when the bridge of a pendant-controlled overhead crane struck the self-propelled elevating work platform in which he was elevated. One of the building owner's employees was using the crane to load a machine on the east side of the building and was in the process of returning the crane to the west side of the building. The decedent was elevated in a Sky Jack scissor lift to work on the speaker system in a new building addition. The decedent had placed the elevated work platform into position on the west side of a building crossbeam. He had placed cones around the Sky Jack but had not locked out the pendant-controlled crane or positioned a safety monitor. The firm for whom the decedent worked was required to notify the crane operator when work was to be performed in the vicinity of crane operation; the decedent did not notify the crane operator. The decedent elevated the Sky Jack's work platform 24 feet above the ground to work on the speaker system. While returning the crane to the previous location, the crane operator, who was walking on the ground with the pendant/lifting beam, did not appear to notice the Sky Jack or the cones placed around the Sky Jack. The crane's bridge struck the decedent's elevated platform and toppled it. The decedent and the Sky Jack landed on steel bar storage racks and other machine parts. The decedent was taken to a local hospital and died several weeks later from complications of the injuries sustained at the time of the incident. Reference: MIFACE Summary Case 186.

**Case 16** A 31-year-old male journeyman elevator mechanic died when he fell five stories (approximately 88 feet) after stepping into an elevator shaft after opening the shaft doors. The decedent unlocked the lock-out for the traction elevator, which was used to transport trade workers and materials to different levels of the project. He then proceeded to the 5th floor to begin his work duties. The decedent's work practice was to leave the elevator car stationed at the 6th floor, the car's lights in the off position, and the car doors in an open position. Two days prior to the incident, another contractor had asked the decedent if he could use the elevator when the decedent was gone for the weekend. The decedent indicated it was okay to use the elevator and to leave the elevator stationed at the 5th floor, and "locked up" when the contractor was finished. Police records indicate that the elevator was not operated during the weekend hours. The decedent inserted his Lunar key to open the hoist way doors. When he opened the hoist way doors, he stepped off the 5th floor landing into the open shaft, apparently thinking the elevator car was stationed at the 5th floor. He fell to the



elevator pit floor, which was six feet below the 1st floor. After the incident, it was determined that the elevator car was stationed at the 6th floor. First aid was attempted but unsuccessful and the decedent was declared dead at the scene. A miscommunication may have occurred between the decedent and the contractor discussing the elevator. According to the police report, the conversation was regarding access to the elevator machine room on the roof and not the use of the elevator. Reference: MIFACE Summary Case 207.

**Case 17** A 60-year-old male volunteer for a mine association fell approximately 250 feet down one of the shafts. The decedent descended approximately 40 to 50 feet via a ladder to access the mine shaft. The decedent had taken some fabricated ladder sections down with him so he could install these ladder sections to provide escape capabilities in the shaft. The shaft was oriented at a 55-degree angle. It appears that the decedent, as got off the ladder slipped on the rocks, which were slippery due to moisture, and slid approximately 250 feet, landing at a gravel pile in the shaft. The decedent was not wearing fall protection.

**Case 18** A 34-year-old male roofer died in 2008 from complications of injuries sustained after falling from a roof in 1995.

**Case 19** A 41-year-old iron worker was critically injured when a steel beam struck his head after he and the 300 pound cantilevered beam he had been sitting on fell approximately 14 feet. The first I-beam had been lifted and then lowered in line with a 12-foot masonry wall. Four feet of the beam extended past the edge of the wall (cantilevered section) to support a canopy roof. The masonry contractor had previously installed beam plates so the beams could be secured to the masonry wall. The beam plate furthest from the cantilevered section had two threaded rods for securing the beam in place. The beam plate nearest to the cantilevered section was to be welded to the beam. The decedent guided the threaded rods through the predrilled holes in the I-beam and set the beam upon the masonry wall. The decedent then attached the nuts to the threaded rods. It is not known how tight he secured these nuts to the threaded rods. The decedent noted that to get the choker/sling off the beam, the beam had to be lifted to pull the choker free. A rough terrain forklift truck lifted the beam a few inches to allow the choker/sling to be removed. After the choker/sling was removed the beam was lowered back down onto the masonry wall. The beam was not in proper alignment with the beam plate/masonry wall, so the decedent repositioned the beam by pounding it with a 26-ounce hammer. After the beam was in the proper position, the decedent welded the beam to the beam plate closest to the cantilevered section. A second beam was brought to the area by the crane operator and was placed perpendicular to the first beam on the cantilevered section. Another building wall supported one end of the second beam and the cantilevered section of the first beam supported the other end. The decedent crawled out onto the cantilevered section of the first beam and positioned the second beam using the hammer. Wearing a welding shield (no hard hat), he welded the first and second beam together. When he finished welding, he signaled the crane operator to lower the load line releasing the weight of the second beam onto the first beam. When the weight of the second beam was placed on the cantilevered beam, the beam and the block grouted to the bearing plates lifted from the wall. The decedent, still sitting on the cantilevered section of the beam, fell from the beam and 14 feet to the ground. The welded connection of the two beams broke loose and the cantilevered beam with its attached blocks/bearings plate fell to the ground and struck the decedent. The second beam stayed connected to the load line. He died several weeks later in the hospital as a result of the injuries sustained. Reference: MIFACE Summary Case 189.

**Case 20** A 51-year-old male drywall installer died when he fell from a scaffold. Police noted a folding ladder sitting on top of the scaffolding. The decedent had been standing on the ladder before he fell. The ladder was approximately 15 feet from the ground.

**Case 21** A 61-year-old male carpenter died in 2008 from complications of a cervical fracture sustained when he fell 8 feet from the top of a wall in 1988.

**Case 22** A 19-year-old male construction laborer fell from the roof of a five story building through a 26-inch by 24-inch make up air opening of an elevator shaft (chase) to the concrete floor of the basement. Another contractor had placed a metal roof curb measuring 72 3/4 inches long by 40 3/4 inches wide by 14 inches high over the make up air opening, but did not secure it to the roof. There was no marking on the roof or the roof curb indicating the open shaft below. Because of an approaching storm, the company owner determined that the work area should be cleaned up and plywood sheets, which were located a few feet south of the make up air opening, secured. The decedent's two coworkers were walking toward the roof's access stairs with tools and other construction materials and did not witness the decedent's work activity which led to his fall. It is postulated that the decedent was in the process of securing the nearby plywood sheets. It appears he was moving the make up air roof curb so he could place it onto the plywood. The decedent lifted the north end of the curb but apparently did not check under the curb prior to pushing it forward toward the plywood sheets. Due to the size of the roof curb, as he pushed it forward he could not see the make up air opening. He walked into the opening and fell to the basement's concrete floor. He was wearing a fall harness and lanyard, but was not tied off. Emergency response was summoned to the scene. The decedent was transported to a local hospital and was declared dead. Reference: MIFACE Investigation 08MI015.

**Case 23** A 32-year-old male journeyman mason/foreman died as a result of falling from an unguarded working surface of a Hydro Mobile 2 scaffold raised to 35 feet. The scaffold had recently been lowered and moved to its present location. The scaffold was repositioned and used by the decedent and his coworker without reinstalling the guardrails at the ends of the working platform and without proper planking. The decedent and his coworker raised the scaffold to 35 feet above the ground. The scaffold was positioned in a north-south orientation. The decedent was installing backing rod and his coworker was caulking. The two workers worked in a south to north direction, moving backwards on the work platform. The decedent fell from the unguarded edge to the concrete surface below. Emergency response was called, and the decedent was taken to a local hospital. He died in the emergency room.

### ***Manufacturing (Cases 24-26)***

**Case 24** A 38-year-old male steel mill supervisor was pulled off of a catwalk when the air hose to the stinger he was using to clean a nearby conveyor became caught between a belt conveyor and an idle roller. The supervisor struck the framework at the mounting point of the belt conveyor tension roller and fell to the floor below. The decedent was on a catwalk located approximately 11 feet above the floor using a 10-foot-long metal pipe (stinger) with a valve connected to a compressed air line. The decedent was blowing debris from a non-operational conveyor table and rollers located parallel to the catwalk. The unguarded belt conveyor was located 72 inches above the catwalk and then turned downward from above the catwalk 25 inches away from the 42-inch standard rail of the catwalk. Facing the non-operational conveyor, with the stinger/air line placed over his shoulder, he passed under the belt conveyor and its idle roller, which was located behind him. It appeared that the stinger/air hose became entangled in the belt conveyor's idle roller, drawing the decedent over the catwalk handrail where he struck against the framework supporting the belt conveyor and its tension roller. The decedent then fell to the floor. The air hose and stinger, his hard hat and his respirator were found jammed between the framework and the tension roller. One of his crewmembers standing in another area of the building looked in and saw him lying on the floor. Another crewmember used the decedent's radio to call for help. Because of the excessive noise in the building, it was necessary for this coworker to exit the building to summon help. A third crewmember ran for help. The company's emergency response personnel were the first to arrive and began emergency treatment. The city fire department rescue squad was the next to arrive. After the fire department called in the decedent's condition to a local hospital, he was declared dead at the scene. Reference: MIFACE Investigation 08MI003.

**Case 25** A 46-year-old male maintenance supervisor died as a result of a 30-foot fall through a roof to the concrete floor below. The decedent had been called back to work to address a problem caused by a broken belt that fed scrap to a conveyor, which then moved the scrap to a feed drum. The feed drum pre-heated the scrap before it proceeded to a furnace. Common ductwork from the feed drum and furnace connected to a flue damper located on the roof. The production foreman informed the decedent that he had tried to open the flue damper with a cable from the ground but wasn't sure if the flue damper had opened. The decedent accessed the roof by a fixed ladder and platform to determine if the flue damper was open or closed. The production foreman followed him and stayed on the platform while the decedent walked across the roof to the flue damper's location. The roof was constructed of TMC #3.0mm Bakelite Corrugated Plate, 1/8 – inch thick. The roof was not strong enough to support the weight of the decedent as he walked. A portion of the roof gave way and he fell 30 feet to the floor below. The production foreman descended the fixed ladder and called for emergency response. Emergency response arrived and the decedent was transported to a local hospital where he died. Reference: MIFACE Summary Case 182.

**Case 26** A 48-year-old male mechanic in the automobile industry died after a fall of unknown height to the floor.

### ***Retail Trade***

**Case 27** A 79-year-old male slipped and fell on a stair case after picking up a previously owned automotive employee-driven company car (pep car). He passed away five days later.

**Case 28** A 63-year-old female meat department salesperson at a retail store fell forward from a standing height, striking her head. She was found by her coworkers unresponsive and transported to a local hospital via ambulance. She died the next day from her injuries.

### ***Professional, Scientific, & Technical Services***

**Case 19** A 60-year-old female market researcher died from a fall of unknown height.

### ***Administrative & Support & Waste Management & Remediation Services***

**Case 30** A 47-year-old male tree trimmer/arborist was killed when he fell approximately 60 feet while topping a 90-foot tall, two-foot diameter white pine. The decedent was a member of a three-person crew contracted by a homeowner to remove the tree following damage it sustained by a lightning strike three days prior to the incident. The company owner, the decedent, and another coworker arrived at the site with a boom truck to remove the tree. The owner and the decedent began removing the branches. The boom truck had a maximum height of 63 feet to gain elevation during the tree removal process. After working several hours, they reached the limit of the boom. The owner and decedent, who had owned his own tree trimming company for over 15 years, assessed the tree and determined that the tree could withstand the strain of topping it. The decedent was wearing a safety harness when he roped off to the tree and climbed out of the boom to begin preparing to top the tree. At this point, the company owner lowered the boom back into the cradle of the truck and then moved to a position approximately 20 feet in front of the truck. The company owner watched the decedent top the tree. As the company owner turned away, he heard a loud crack and looked up to see approximately 30 feet of the tree trunk, the decedent, and the top part of the tree falling towards him. The owner called out to the other coworker who was approximately 15 feet away to run. The tree trunk had broken off approximately 30 feet above the ground. The decedent landed face down with part of the tree on top of him. The crew immediately called 911 for help. A neighbor came to the incident scene and asked the workers to cut away the tree on top of the decedent and began CPR. Emergency response arrived and the decedent was taken to a local hospital where he was declared dead. Reference: MIFACE Summary Case 187.

## ***Education***

**Case 31** A 72-year-old male college administrator fell while at work and sustained head injuries. He died two months later from complications of the fall.

## ***Arts, Entertainment, & Recreation***

**Case 32** A 69-year-old male laborer died due to a fall of unknown height.

**Case 33** A 70-year-old male air museum volunteer died from complications of a head injury sustained when he fell from an aircraft tug. He was the crew leader of a three-person ramp crew. The tug was traveling westwardly at below five miles per hour toward an airport taxiway. The tug had a front seat designed to accommodate two individuals. The decedent was positioned on the back of the tug in an area behind the front seat that was designed for equipment storage. He was in a squat position with his right side against the seat frame. He held onto the seat frame to maintain his position. The decedent was wearing a baseball cap. It is postulated that a gust of wind began to blow the cap off of his head. In his attempt to keep his cap, the decedent released his hands from the seat frame, stood up and reached for it as it blew off. He lost his balance and fell to the tarmac on the driver's side of the tug. The tug stopped immediately and radioed for assistance. Emergency response personnel were on scene within one minute. They initiated treatment, and then the decedent was transported by helicopter to a nearby hospital. He died eight days later from complications of the head injury sustained at the time of the fall.

## ***Accommodation and Food Services***

**Case 34** A 79-year-old female restaurant worker slipped and fell on the ice in the business's parking lot. She died due to medical complications from the injury.

## ***Other Services***

**Case 35** A 47-year-old male heating ventilation and air conditioning (HVAC) technician died when he fell ten to fifteen feet from an extension ladder to the pavement during the preparation activities to wash air conditioning cooler coils on a store's roof. The Werner aluminum extension ladder he was using had a rated capacity of 300 pounds. Although the ladder was identified as a 28-foot extension ladder, the 28-foot ladder only had a 25-foot working length, and a 21-foot 6-inch step off elevation based upon the manufacturer's recommendations indicated on the label on the ladder. The height from pavement to the top of the wall was 23 feet 6 inches. The pavement was wet due to a recent rain but it was not raining at the time of the incident. Prior to setting up the ladder, the store's assistant manager spoke with the decedent, who after hooking up one hose to a water spigot inside, went outside to his truck for additional hose. The decedent was approximately one-half way up the ladder when the incident occurred. Witnesses saw the ladder slide along the wall. When responding police arrived, the ladder was lying flat on the pavement between the decedent and the building. It is postulated but not confirmed that the decedent was carrying a 15- to 20-foot garden hose while climbing the ladder. The decedent struck the back of his head on the pavement. The decedent was airlifted to a local hospital where he died the next day. Reference: MIFACE Summary Case 193.

**Case 36** A 53-year-old male minister died from a fall of unknown height from a ladder he was using to arrange pictures in the church.



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## Fire/Explosion (3)

### ***Construction***

**Case 37** A 27-year-old male pipe technician was killed when he was struck by pieces of pipeline and explosion forces from a 54-inch coke oven gas (COG) pipe that exploded during repair activities. The site owner had subcontracted the company for whom the decedent worked to perform pipeline repairs. A bypass pipeline had been constructed on a 42-inch live COG pipe to an unused 54-inch COG pipe to allow for repairs in the future on the 42-inch COG pipe. The live 42-inch COG pipe was pressurized to 200 inches water column. The decedent and two crewmembers were hand tapping and using a pneumatic drill to affix gasketed steel cladding to patch the 54-inch pipe while two additional crewmembers were working on the ground. One patch was successfully installed before lunch. After lunch, the crew returned to work and was working on a second patch using a pneumatic drill and hand taps. Shortly after lunch, the three workers were affixing the second of three patches when an explosion occurred in the 54-inch pipe. The pipeline blew apart. The decedent's two coworkers survived and both made their way to the ground. The decedent was killed as a result of the explosion. After the dust from the explosion settled, the decedent was observed in his fall protection harness hanging upside down from the pipe's supporting ironwork near the area of the explosion. Emergency response was called. The site owner's security team arrived and began resuscitative efforts. Emergency personnel arrived and the decedent was declared dead. Reference: MIFACE Investigation 08MI001.

### ***Manufacturing***

**Case 38** A 54-year-old male journeyman electrician died of burn complications sustained in an arc flash while checking the fuse in a 480-volt distribution panel that supplied power to a lighting transformer. The distribution panel was approximately 3-1/2 feet wide and 5 feet tall. The panel had six buckets, three on each side of the panel front. Each bucket had an individual hinged door with a "disconnect." Within each bucket were three horizontal cartridge fuses that were held in place with spring fuse holder clips located on each end of the fuse. A thermal image photo showed that an area in one of the buckets was overheating. The decedent had opened the door to this bucket via the "disconnect" to check the clips and lugs. He removed the three clips for the 100-amp fuses. It is unknown if the decedent tested for power after he opened the bucket door. The supervisor arrived at the incident site. He stated that the decedent indicated that he was going to change the fuses and that the fuse clips didn't need changing because they were tight. The supervisor stood to the right of the decedent. The decedent stuck his screwdriver into the top fuse clip on the right side of the opening and spread the clip to show his supervisor that the clip did not need to be changed. The supervisor stated that the decedent pulled his screwdriver out to move down to the next clip and the panel exploded. Both the supervisor and the decedent sustained burn injuries. The decedent died four weeks later from the third degree burn injuries sustained at the time of the incident. When the "disconnect" for the bucket was turned "off," the bucket was supposed to be de-energized. A service disconnect circuit breaker was located on a mezzanine platform that supplied the panel where the arc blast occurred. After the blast, the "disconnect" on this service panel had to be manually opened to shut down the power to the panel. It is unknown if the decedent was using an insulated screwdriver. Reference: MIFACE Summary Case 180.

### ***Transportation & Warehousing***

**Case 39** A 60-year-old male truck driver died of smoke inhalation and body burns when the semi-tanker containing 7,200 gallons of butane liquid gas he was driving struck a cement barrier wall. The semi was traveling approximately 60 mph in the right lane of a dry, four-lane highway with a posted speed limit of 70 mph. The tractor veered towards an exit lane as if to exit, but abruptly turned back into the right lane. The tractor then went from the right lane onto the right shoulder striking the wall. The tanker became disengaged at the

point of impact sending the tanker over the gorge plunging over the side of a bridge. The tanker exploded upon impact sending its contents over a wide area under the bridge and started several structural fires. The tractor portion continued skidding on the barrier wall catching fire and trapping the decedent inside. The decedent was wearing his seatbelt/shoulder harness. The semi tractor was not equipped with airbags.

## **Homicide (13)**

### ***Construction***

**Case 40** A 35-year-old male carpenter who was working in a bakery died due to multiple gunshot wounds during a robbery.

### ***Retail Trade (Cases 41-44)***

**Case 41** A 48-year old Hispanic male who performed odd jobs at a gas station/convenience store died due to a gun shot wound.

**Case 42** A 66-year-old male grocer died of complications of a blunt force head injury sustained in a 2006 assault at his grocery store.

**Case 43** A 61-year-old male jewelry storeowner died due to a gunshot wound during a robbery at his business.

**Case 44** A 36-year-old male party store manager died of multiple gunshot wounds during a robbery attempt.

### ***Transportation & Warehousing***

**Case 45** A 22-year-old male towing company driver died of multiple gunshot wounds.

### ***Real Estate & Rental & Leasing***

**Case 46** A 33-year-old male real estate agent was killed by a gunshot to the head by a disgruntled former client.

### ***Administrative & Support & Waste Management & Remediation Services***

**Case 47** A 54-year-old male mall janitor died of complications from a blunt force head injury sustained in 2007 when he fell into a dumpster located in an outdoor parking corridor area between a store and the corridor entrance door to a post office at a shopping mall. The dumpster was confirmed as having the door closed at the time of the incident. A store employee who was going to work heard moaning, and found the decedent. An assault or an unintentional fall were possible alternative explanations.

### ***Accommodation & Food Services (Cases 48-50)***

**Case 48** A 41-year-old male security guard died due to a gun shot wound while protecting a patron at a night club.

**Case 49** A 21-year-old female restaurant manager died due to a gunshot wound in the parking lot of the restaurant.

**Case 50** A 24-year-old male bar owner died of complications sustained after he was shot at his bar during a robbery attempt.

### ***Public Administration (Cases 51-52)***

**Case 51** A 28-year-old male police officer was killed by a gunshot wound at an apartment complex after a

traffic stop.

**Case 52** A 58-year-old male police officer died from complications from a gunshot wound sustained at a domestic incident.

## Machine (12)

### *Agriculture (Cases 53-58)*

**Case 53** A 85-year-old male farmer died when his tractor rolled into a pond and pinned him under the tractor. The decedent had been brush hogging around a pond/reservoir used to irrigate the farm. It appears that he backed too close to the pond, causing the brush hog to enter the water. The weight of the brush hog most likely pulled the tractor down into the pond, causing it to overturn and pin the decedent under it.

**Case 54** A 79-year-old male farmer was killed when a tractor and disc trailer ran over him. The decedent had returned from using the disc trailer in nearby fields. The tractor either stalled or stopped on a long, sloped driveway. The decedent may have not fully engaged the gearshift in the park position prior to descending from the tractor. The decedent attempted to start the tractor as he stood on the ground positioned between the front and rear wheel. The tractor began to roll down the driveway. He was run over by the tractor's rear wheel and the disc trailer. It is unknown if the decedent attempted to climb onto the tractor to try to stop it from moving or if he was unable to move away from the tractor quickly enough.

**Case 55** A 82-year-old male farmer was pinned under an overturned 1953 Ford 801 Jubilee tractor. The decedent was attempting to pull a tree out of a tree line. He had attached a chain to the back of the tractor and the tree. The decedent was found in an upside down seated position with the tractor on top of him. His chest cavity and hip area was bearing the weight of the approximately 3,500-pound tractor. The tractor was not equipped with a roll over protection structure (ROPS) and seat belt system.

**Case 56** A 71-year-old male farmer died when he fell or was thrown from a 1972 16S Massey Ferguson tractor that collided with trees in a fence row. The decedent had been traveling northbound in a field conditioning hay. It appears that he was attempting to make a turn to continue the fieldwork. During the turn, the tractor collided with several small trees. The tractor then had a collision with a large tree, causing the decedent to either fall or be thrown from the tractor and the tractor's steering wheel to be broken off of the tractor. The tractor came to rest with its left rear wheel on the decedent. The tractor was not equipped with a ROPS/seatbelt.

**Case 57** A 85-year-old male farmer died when he was run over by a Massey Ferguson 35 farm tractor with a manure spreader attached. It was not clear as to whether the tractor had slipped into gear, if it was accidentally left in gear when he was trying to dismount the tractor, if he hit the gear shift as he dismounted, or if he fell from the tractor while dismounting. The manure spreader had leaves as well as a rake and bushel basket that the decedent used to pick up leaves that he spread on his fields. It appears that the decedent stopped the tractor near a pole barn so he could take the bushel basket and rake out of the manure spreader and return them to the barn prior to traveling with the leaves to the fields. It appears that the decedent was getting off the left side of the tractor when the incident occurred. Once the left side tractor wheels ran over the decedent, it made a hard right turn and continued its movement until it struck a barn and stopped.

**Case 58** A 58-year-old male farmer died due to asphyxiation when his clothing became entangled in an ear-corn conveyor rotating motor drive-shaft. The elevator was powered by two hydraulic lines connected to the tractor. The unguarded motor drive-shaft had four bolts, one on each side of the shaft's connecting hub that

tended at least two inches from the shaft. The decedent's left sleeve became caught on the bolts as the shaft rotated. The corn elevator and the gravity box he was unloading were empty. His son, who came out to help him, found him lying on the ground with his head resting on the motor and his shirt tightly wrapped around his upper torso and neck. His son ran to the house and called for his mother to come outside. While emergency response was en-route, the decedent's son found a knife and attempted to cut the decedent's clothing away from him. Police and emergency response arrived and declared the decedent dead. Reference: MIFACE Investigation 08MI134.

### ***Construction (Cases 59-60)***

**Case 59** A 52-year-old male laborer died when he was run over by a bulldozer. The decedent and a family member were hauling gravel and spreading it out on a driveway. The family member was spreading gravel with the bulldozer and noted the decedent down on his knees cutting roots out of a driveway with a hatchet. As the family member backed the bulldozer, he ran over the decedent. The bulldozer backup alarm was operational. The family member drove the bulldozer off of the decedent. The decedent went into shock. Emergency response was called, and the decedent was transported to a local hospital where he died.

**Case 60** A 75-year-old male owner of a plumbing and heating company was killed when he was pinned under a bulldozer, which tipped and landed on him as he was loading it onto a trailer. The decedent had finished backfilling a geothermal unit trench. The company usually used a backhoe to backfill the geothermal trenches but the decedent thought that a bulldozer would be quicker and brought his personal bulldozer to the job site. Two coworkers told the decedent that when he was finished backfilling to come and get one of them to load the dozer onto the trailer. Typically, the decedent did not load the bulldozer on to a trailer. The two coworkers were working in the home's basement and could hear the dozer moving around the house toward the trailer. After a few minutes they did not hear the dozer running and figured that the decedent had shut it down until they came up to load it. One of the coworkers came out of the basement to get material and saw the decedent pinned under the bulldozer. Reference: MIFACE Summary Case 203.

### ***Manufacturing (Cases 61-64)***

**Case 61** A 59-year-old male traffic supervisor, who was wearing a white hard hat, died when he was struck by a Yale clamp truck that was transporting a paper roll that was approximately 59 inches tall and 50 inches wide. The decedent, who was not using the designated pedestrian aisleway, was walking through the forklift travel area of the paper roll storage warehouse on his way to the shipping and receiving offices. The driver, who had entered the roll storage area through the doorway, was traveling in a forward direction (not trailing the load). He intended to place the roll in its appropriate place on 2- by 4-inch pieces of wood. The clamp truck/paper roll struck the decedent. The driver looked to his right on the ground and could see the decedent's body to the right of the truck's right tire. He immediately backed up and called for emergency assistance. Emergency response arrived. The decedent was declared dead at the scene. Reference: MIFACE Investigation 08MI010.

**Case 62** A 52-year-old male foreman/machine operator at a sheet plastic manufacturing company was burned while he while performing a routine check of a plastic extruder machine. The machine was operating and in production. It is unknown if he heard or saw a problem with the machine. As he bent over the machine near the area that caught his attention, a welded area at the center roll of the machine that held a hot water jacket around the sheet roll to keep the rolls hot broke open, and sprayed him with 220-degree F hot water and steam. He died in the hospital six days later from complications of the injury. Reference: MIFACE Summary Case 181.

**Case 63** A 48-year-old male machinist died when he contacted a rotating vertical cutting head of a gantry



mill. The decedent programmed the gantry mill to begin a milling operation. Leaving the remote pendant attached to the gantry mill frame, he walked approximately seven feet from the home position of the cutting head near the south end of the 14 1/2-foot wide by 50-foot-long part being machined. The vertical cutting head home position was 3 inches south, 2 inches west and 30 inches above the part. The head descended to perform a 2-inch cut. The head moved at cut height west to east to align with the starting point of the cut and began traveling north into the material. At some point during the head movement, the decedent came into contact with the rotating head. His clothing became entangled in the cutting head and his body was drawn into the cutting head. He sustained both head and upper torso injuries from the cutting head. A co-worker heard strange noises coming from the machine and observed the decedent being drawn into the cutting head. The coworker ran to the machine and yelled for help, but because he did not know the machine's operation, did not hit the emergency stop. A representative from the firm for whom the part was being manufactured was nearby taking measurements. He ran to the incident scene and activated the emergency stop. The owner was called to the scene. The owner, part representative and coworker initiated CPR and attempted to stop the bleeding. Emergency response arrived and the decedent was transported by helicopter to a nearby hospital where he was declared dead.

**Case 64** A 39-year-old male die setter was killed when he was pinned between two bolster plates. Two pneumatically driven bolster plates, which transported product into a press, were involved in this incident; bolster plate A (BP-A) and bolster plate B (BP-B). Prior to the incident, BP-A was located 12 to 18 inches north of BP-B on the plant floor. The decedent and two coworkers had conducted die setting activities on BP-A. BP-A was 188 inches tall by 288 inches wide and moved in a north/south direction at a rate of 0.425 sec/foot. A pendant control with two thumb levers labeled On or UP was used to initiate and stop BP-A's movement into and out of the press, which was located to the north of BP-A. The pendant control thumb levers must be depressed to initiate movement. The pendant's reaction time was 0.123 seconds. It appears that the decedent was in the process of moving BP-A into the press. He hooked up the air hose to drive the axles that moved the bolster's wheels. He depressed the appropriate thumb lever on the pendant control located on the southeast corner of BP-A, but BP-A did not move north toward the press. He walked to the southwest corner of BP-A where he found an air ball cock valve in the closed position. He opened the valve, and BP-A began to move south, toward BP-B. He was pinned between BP-A and BP-B. Reference: MIFACE Summary Case 197.

## Motor Vehicle (30)

### *Agriculture*

**Case 65** A 40-year-old Hispanic male laborer/truck driver died when his vehicle collided with a semi-tractor. It was dusk. The decedent was making a right turn onto a dry, two-lane roadway with a posted speed limit of 40 mph. The decedent failed to yield and his vehicle was struck by an oncoming semi truck. It is unknown if the decedent was wearing a seat belt/shoulder harness.

**Case 66** A 52-year-old male farmer died when he was pinned under a Kubota RTV 900 utility vehicle driven by an elderly family member. The vehicle was traveling from one pasture to another pasture. The decedent opened a 16-foot field gate and stood at the end of the gate. The Kubota hit and then bounced off of a gate post, causing the driver to lose control of the vehicle. The decedent was standing near the end of the gate. The Kubota struck the decedent, who was pushed backward and over an electric fence, causing the fence to be pulled out of the insulator. The Kubota continued forward, through the fence and over a berm, coming to rest with the rear axle on the decedent's chest. The driver was unable to free the decedent from under the

hicle. The driver summoned neighbors for assistance. Emergency response was called. The decedent was declared dead at the scene.

### ***Mining***

**Case 67** A 39-year-old male truck driver died when the truck he was driving veered off of the highway causing his load of pipe to shift, break through the rear headache rack, enter the semi cab, and strike him. The decedent was traveling eastbound on a dry, two-lane roadway with a posted speed limit of 55 mph. Approximately one-quarter mile past a curve in the road, the decedent veered off the road onto the shoulder and then from the shoulder to a ditch. The semi traveled approximately 138 feet in the ditch before the driver applied the brakes. After applying the brakes, the load slid forward, breaking the tie down straps. The pipes slid forward and penetrated the rear headache rack. A load of pipe struck the decedent and proceeded through the front windshield. Based upon the lack of braking upon leaving the roadway and that there was no attempt at corrective steering, the police department's opinion was that the driver was distracted or fell asleep at the wheel. The decedent was wearing a seatbelt/shoulder harness. The vehicle's airbag did not deploy.

### ***Construction***

**Case 68** A 55-year-old Hispanic municipal truck driver was critically injured when a three-ton dump truck, which was backing up hit him in a street work zone. The decedent had returned from dumping his spoils as a second dump truck driver with a full load was leaving the site. The site supervisor radioed the drivers to switch dump trucks. The decedent gathered his personal belongings (lunch container, newspaper, etc.) and exited his truck. As the decedent walked behind his truck to switch trucks, he dropped his newspaper. The second driver entered the decedent's dump truck and looked for him using the dump truck mirrors. He saw the decedent in the passenger side rear view mirror. The decedent, noting he dropped his newspaper, walked back behind the truck and bent down to retrieve it. Simultaneously, the second driver began to back the decedent's truck to the excavation site. The excavation crew noticing the decedent was in the path of the backing dump truck ran toward the vehicle and yelled warnings to him and the driver. The decedent stood up and was struck by the backing truck. Emergency response was summoned and the decedent was transported to a local hospital. He died approximately two weeks later in the hospital from complications of the injuries sustained at the time of the incident. Reference: MIFACE Investigation 08MI040.

### ***Manufacturing, Finance & Insurance***

**Case 69** A 44-year-old male food broker (driver) and a 42-year-old male sales manager (front seat passenger) died after the SUV (Vehicle #1) in which they were traveling crossed the centerline and struck a logging semi-truck. Vehicle #1 was traveling southbound on a dry, two-lane highway with a posted speed limit of 55 mph. The logging truck was traveling northbound. The logging truck driver noted Vehicle #1 drift over the centerline, but thought that the driver would correct this action and return to the southbound lane. Vehicle #1 continued on and was completely in the northbound lane. The logging truck was limited by a guardrail and was unable to successfully complete an evasive maneuver. Vehicle #1 struck the logging truck head on. Both of the decedents were wearing their seat belts/shoulder harness. The SUV's airbags deployed. The driver was declared dead at the scene. His passenger was flown to a nearby medical center and died later the same day.

### ***Wholesale Trade (Cases 70-71)***

**Case 70** A 60-year-old male laborer driving an International Harvester Model 1-240PI forklift was killed when the forklift was struck by a vehicle. The forklift was transporting a cherry tank from a farm to a field located approximately one mile away on a dry, blacktop two-lane road, with an un-posted speed limit of 55 mph. The forklift was traveling westbound with the outside tires of the forklift in the area of the fog line on

the roadway. The decedent was traveling in reverse, trailing his load. The forklift had four white lights, two that pointed over the top of the cherry tank, one pointed down lower and the other almost directly straight behind. There were two white lights on top of the forklift cage, which pointed to the rear of the vehicle, one which was non-functional and one which was functioning. The rear of the forklift (facing eastward) had a slow moving vehicle sign. The decedent had just traveled down a small hill. The westbound vehicle crested the hill and struck the forklift. Responding police estimated the vehicle which struck the forklift was traveling approximately 50 to 60 mph. The point of impact was approximately 550 feet from the crest of the hill. The decedent was ejected from forklift upon impact by the vehicle. Reference: MIFACE Summary Case 192.

**Case 71** A 44-year-old male store owner died when he was struck by a semi truck after he exited his work vehicle. The incident occurred on a three-lane concrete expressway with a speed limit of 70 mph. The decedent had been traveling southbound. He had parked his work van on the right shoulder of the expressway. The vehicle was left running. The semi truck driver noted the parked vehicle, and began to move to the middle lane. The decedent exited the van from the driver side rear sliding door out into the lanes of traffic. He crossed the right traffic lane and was struck by the semi truck in the center lane.

### ***Retail Trade***

**Case 72** A 51-year-old female newspaper delivery person and the 17-year-old male front seat passenger who was working with her died when the vehicle entered into a 70-foot long "wash out" of both lanes of a roadway. The decedent was driving in heavy rain conditions on a dark, unlit, two-lane road. The washout caused the decedent's vehicle to drop 35 feet into a ravine filled with rushing water. The vehicle was located at daybreak in the ravine on its roof under water. Both decedents were wearing seat belts/shoulder harnesses. The vehicle's airbags deployed.

### ***Transportation & Warehousing (73-77)***

**Case 73** A 58-year-old male truck driver was killed when he failed to stop his heavy duty pickup truck (Vehicle #1) at a posted Stop sign and was struck by another vehicle. The decedent's vehicle was traveling westbound during the early morning hours on a dark, unlit, dry two-lane secondary county road with an unposted 55-mph speed limit. The county road had stop signs in both directions at the intersection of a two-lane county highway. Vehicle #2 was traveling southbound, at approximately 50 mph on the county highway. Vehicle #1 approached the intersection and failed to stop at the posted stop sign. Vehicle #2 struck Vehicle #1 just behind the right passenger side box, causing Vehicle #1 to strike the curb and stop sign, and then roll over onto its roof into a small drainage ditch. Vehicle #1 rolled a second time, finally coming to rest on its roof. Vehicle #2 also hit the same drainage ditch, rolled over onto its roof, and ejected the driver. The decedent was wearing a seat belt/shoulder harness. The pickup truck's airbags did not deploy.

**Case 74** A 46-year-old male tow truck operator/driver was killed in the early morning hours after being struck by a vehicle while in the act of assisting a motorist alongside a dry, dark, unlighted three-lane expressway with a posted speed limit of 70 mph. A previous crash had caused the closure of one lane of the roadway. Responding police closed the lane using a police vehicle with its flashing lights activated and flare pattern. Two lanes were still open for traffic. The decedent had placed his tow truck with the emergency lights activated in the closed lane and positioned it to pull a vehicle from a ditch. The decedent had attached the tow cable to the vehicle in the ditch and was operating the wench. A vehicle driven by an individual under the influence of alcohol was traveling westbound in the right lane of the open lanes. The driver ran through the flare pattern and swerved over and struck the left rear of the tow truck. The decedent was struck and then thrown 120 feet west, coming to rest under a vehicle parked on the shoulder. After striking the tow truck, the vehicle crossed the two open lanes coming to rest with his vehicle occupying the two open lanes. Police administered several breath tests to the driver of the vehicle which struck the decedent. The breath tests re-

sults indicated the driver exceeded the threshold for alcohol allowable by law.

**Case 75** A 30-year-old male truck driver (Driver #1) and a 48-year-old male truck driver (Driver #2) died when Driver #1 crossed a 50-foot grass median of an expressway and collided head-on with the semi truck operated by Driver #2. The incident occurred in the early morning on dry, unlit, four-lane expressway that had two eastbound lanes and two westbound lanes separated by a grass median. The expressway had a posted truck speed limit of 60 mph. Driver #1 was traveling westbound in the right-hand lane and Driver #2 was traveling eastbound in the left lane of travel. The police report indicated that the crash dynamics demonstrated that the vehicles were traveling at or near the posted speed limit. Both of the decedents were found in their respective truck cabs. Both of the truck cab's air bags deployed.

**Case 76** A 34-year-old male truck driver was killed when the truck he was driving rear-ended another semi. The decedent's was transporting one roll of coiled steel weighing 42, 860 pounds traveling eastbound on an expressway at an unknown rate of speed. The two-lane expressway was dry with a posted truck speed limit of 60 mph. The decedent's semi veered off the roadway to the right after hitting the semi trailer and into a wooded ditch. The decedent's semi hit some small trees and then came to a stop. The coil broke free from the trailer, crashed through the cab of the truck, and landed approximately 50 feet in front of the truck. The decedent was thrown from the demolished semi tractor cab, landing approximately 20 feet in front of the truck. The decedent was not wearing a seat belt/shoulder harness. The truck was not equipped with an air-bag.

**Case 77** A 45-year-old male truck driver was killed when his vehicle collided with a train at a railroad crossing. The northbound train approached a railroad crossing as the decedent was traveling eastbound on a private roadway. The roadway had had a cross buck railroad sign (had the words "RAILROAD" and "CROSSING" in black and white assembled in a large "X" configuration) and a Stop sign posted at the railway. It is unclear if the decedent stopped at the railroad crossing; one witness indicated that he did and another witness indicated that he did not stop, and one witness could not tell if he stopped or did not stop. The locomotive was hauling 16 railroad cars and was traveling approximately 27 mph. As the train neared the crossing, the decedent pulled his vehicle forward across the tracks and into the path of the oncoming train. The train engineer activated the emergency brakes but was unable to avoid the collision with the semi tractor. When the train struck the semi tractor, the decedent, who was not wearing his seat belt, was ejected from the vehicle and landed on the railroad tracks. The train's lights were on, and the horn and bells had been activated. The police report indicated that there were no visual obstructions to impede the decedent from noting the oncoming train.

### ***Real Estate & Rental & Leasing***

**Case 78** A 66-year-old female office manager was struck and killed by a pick up truck as she was walking across a road to pick up the business' mail from the mailbox. The dry, two-lane roadway was straight at the incident location and had a posted speed limit of 35 mph. The mailbox was one of several located on the east shoulder of the roadway, which was oriented in a north/south direction. The pick up truck was traveling northbound. The incident occurred at the top of a hill. The police report stated that the hillcrest may have caused a vision obstruction for the pedestrian but did not cause a vision obstruction for northbound traffic. There were no pedestrian crosswalks in the area. The decedent was wearing light colored clothes. She had crossed the southbound lane and was approximately 6.5 feet into the northbound lane, when the pick up truck, traveling approximately 40-45 mph struck her. The decedent was declared dead at the scene.



### ***Professional, Scientific, & Technical Services***

**Case 79** A 41-year-old male accountant died as a result of a head-on collision with another vehicle.

### ***Administrative & Support & Waste Management & Remediation Services***

**Case 80** A 30-year-old Hispanic male landscaping laborer died when the dump truck he was a passenger in collided with a sport utility vehicle (SUV). The driver of the dump truck was at an intersection with a traffic light. He was turning left onto a southbound road. The sport utility vehicle, which had been traveling eastbound, proceeded through the yellow light and struck the front of the passenger side of the dump truck when the truck turned into the SUV's path of travel. The speed of the SUV could not be determined, although a witness indicated it had accelerated to get through the yellow light. The traffic light was functioning normally. The decedent was wearing a shoulder harness/seat belt. The dump truck's air bag did not deploy.

### ***Health Care & Social Assistance (Cases 81-82)***

**Case 81** A 59-year-old female respiratory therapist was killed when the vehicle she was driving crashed into the back of a semi tractor trailer that was in the process of making a left turn. The decedent was traveling eastbound on a dry, two-lane roadway with a posted speed limit of 55 mph. The decedent was traveling back to her workplace with her medical equipment/records after performing home visits. The semi truck was stopped in the eastbound left lane to make a left hand turn with its left turn signal activated. The decedent was not wearing a seat belt/shoulder harness. The vehicle's airbag deployed.

**Case 82** A 23-year-old female emergency medical technician who was assisting a stranded motorist (Vehicle #1) was killed when another vehicle (Vehicle #2) left the roadway, striking and pinning her between Vehicle #1 and Vehicle #2. Vehicle #1 had lost control and spun into a steep ditch filled with water amid icy road conditions and snowy weather along a 70-mph highway. The ambulance was parked on the shoulder with its flashing lights activated. Vehicle #2 entered a curve traveling too fast for the slick road conditions. Vehicle #2 lost control and left the roadway. The decedent's coworker saw the out-of-control vehicle and yelled a warning to the decedent who was attending to the stranded driver. She was unable to move out of the way quickly enough and was struck and pinned between Vehicles #1 and #2.

### ***Arts, Entertainment & Recreation***

**Case 83** A 71-year-old male race car driver died when the vehicle he was driving left the racetrack at the first turn, became airborne, and struck an outer raceway nine-foot dirt embankment. The race car was traveling approximately 110 mph on a straight away coming into the turn. It appears that the decedent did not brake into the turn. He left the racetrack, went airborne through a gravel portion designed to slow down out-of-control vehicles. The car then impacted the bottom of the outer raceway barrier located approximately 70-80 yards away from the end of the race track. When the vehicle returned to the ground and struck the outer barrier, it went up an embankment until it came to rest with the rear of the vehicle resting at the bottom of the barrier. The decedent was restrained in a five-point harness and was wearing a helmet, which was found to have sustained heavy damage.

### ***Other Services (Cases 84-87)***

**Case 84** A 23-year-old male laborer in an automobile repair shop died when both he and the Kawasaki Tecati Model XF 250 four-wheel all-terrain vehicle (ATV) he was test driving in the parking lot struck a concrete wall. The decedent did not wear a helmet or other protective equipment. The ATV did not have a seat. The decedent drove the ATV to the west end of the building parking area. Turning around at the west end, he then rode to the east side of the lot. As he was traveling eastbound, he attempted to turn the ATV to the left (north) as he was approaching the east end of the parking area. He put his right foot down on the ground at

which time it was run over by the ATV's rear tire. The decedent lost control of the ATV and it flipped to its right side and rotated counterclockwise. Both the ATV and the decedent struck a concrete wall at the east end of the parking area. His coworker and a witness ran to him and began CPR and called for emergency response.

**Case 85** A 66-year-old male and a 48-year-old male, two political campaign workers activists, died when they were struck by a gravel truck as they were refueling their van on the shoulder of a dry, dark, unlit 70-mph highway. The vehicle had been parked on the shoulder to refuel and to secure (tape) a loose rear passenger side window. The van's driver had activated the hazard lights. The van also had a faulty gas gauge and the employer had instructed them to not let the gauge indicate a fuel level less than one-half full. The decedents walked to a nearby gas station to fill a portable gas can. One of the decedents was refilling the tank and the other decedent was standing nearby. The driver was sitting in the van's driver's seat. As the gravel truck approached, a witness noted both decedents running on the shoulder towards the front of the van when the truck struck them. The driver heard a bang, and then noted one of the decedents lying in the roadway. The driver pulled this individual from the roadway.

**Case 86** A 37-year-old male minister was killed when the vehicle he was driving was struck by a semi tractor-trailer. It was snowing heavily at the time of the incident. The decedent was traveling southbound on a snow-covered two-lane roadway which had a posted speed limit of 55 mph. The police determined the decedent was traveling at a speed too fast for the road conditions. The vehicle's speed resulted in his vehicle being unable to come to a complete stop at an intersection causing him to slide into the intersection. An eastbound semi tractor trailer was unable to avoid striking the decedent's vehicle. The decedent's vehicle was struck broadside on the passenger side, became airborne, and struck a tree. The decedent was wearing a lap/shoulder harness. The vehicle's airbag did not deploy.

**Case 87** A 31-year-old male automotive mechanic was killed when his work panel truck carrying tools and other equipment rear-ended a double trailer gravel hauler when the semi was stopped in the right lane due to a roadway construction backup. The incident occurred on a dry four-lane expressway (two lanes eastbound and two lanes westbound) near a major highway interchange. The expressway had a posted speed limit of 70 mph. Traffic had come to a sudden stop due to the narrowing of the eastbound roadway to one lane to enter the construction zone located just east of the interchange. The decedent and the semi had both been traveling in the right lane. Just prior the collision, a vehicle between the semi gravel hauler and the decedent's vehicle abruptly changed lanes to the left lane, which may have obstructed the decedent's view of the stopped semi tractor trailer. The decedent, who may not have realized the semi had stopped, applied the panel truck's brakes approximately 50 feet away from the rear of the semi trailer. Unable to stop, the panel truck rear-ended the gravel trailer and the panel truck caught fire. The decedent was wearing a seat belt/shoulder harness. His vehicle was not equipped with an airbag.

### ***Public Administration (Cases 88-90)***

**Case 88** A 16-year-old female student transportation worker died from injuries sustained after her Michigan Department of Transportation road crew van parked on the right shoulder of a 70 mph highway was struck by an oncoming vehicle. The work van had the hazard flashers and overhead amber beacon activated. The four-member crew was preparing to pick up trash on the freeway's embankment. The decedent and a coworker were standing outside of the van on the shoulder when a vehicle veered off the roadway after the driver fell asleep at the wheel. This vehicle sideswiped a guardrail and then struck the parked van. The impact caused the van to rotate and knock the coworker clear to the grass embankment. The decedent was struck and then "caught up" in the van's rotation. She was thrown clear prior to the van bursting into flames. There were no work crew caution/warning/work zone signs posted prior to the area of the work crew.

**Case 89** A 43-year-old male sheriff deputy was killed when the motorcycle he was driving was struck by a car. The dry, two-lane highway was straight, dark and unlit, and had a posted speed limit of 55 mph. Police noted no visual obstructions. The motorcycle was traveling westbound with its headlight on. The car was traveling eastbound and was in the process of making a left (north) turn from the highway into a driveway. The driver of the car stated in the police report that he thought he had enough time to complete the turn into the driveway. As he made the turn, the decedent applied the motorcycle's brakes, but was unable to avoid the collision with the passenger side of the car. The decedent was dressed in protective leather but was not wearing a DOT approved motorcycle helmet. He was thrown from the motorcycle and was declared dead at the scene.

**Case 90** A 73-year-old female circuit court office manager died in 2008 as a result of complications from being struck by a bus as she was walking across a street returning to her office after delivering court papers in 2002.

## Struck By (16)

### *Agriculture*

**Case 91** A 45-year-old male horse trainer died when he was removing a tree or a tree stump from the ground with a tractor. It appears that the tree/tree stump, as it came out of the ground, struck the decedent and knocked him off of the tractor. He was pinned on the ground by the tractor wheel. He was found by neighbors who noted the tractor without its operator.

**Case 92** A 68-year-old male farmer died when a portable farm elevator fell onto him as he was pulling it away from an ear corn bin with a 7 HP lawn tractor. He had attached a chain to the elevator's axle and to the rear axle of the lawn tractor. There were approximately two bushels of ear corn at the top of the elevator. As he was moving the elevator, the top of the elevator fell and struck his back and head. The impact forced him forward on the tractor seat and pinned him against the steering wheel and gearshift lever. When his spouse heard the lawn tractor running for a longer period than usual, she left the house to check on him. She found him pinned against the wheel. She checked for a pulse and found him deceased. She called emergency response, and when they arrived, the decedent was declared dead at the scene. Reference: MIFACE Investigation 08MI128.

### *Construction (Cases 93-97)*

**Case 93** A 28-year-old male ironworker was killed when the frame of a falsework support tower for a skeleton structure for a ramp to a toll plaza under construction collapsed and struck him. The temporary support towers (falsework towers) were utilized to provide temporary structural support for the ramp's seven steel girders. On the day of the incident, the decedent and two coworkers were assigned to remove seven towers (supporting seven girders designated A-G) that had been erected. To lower and remove the towers, the site engineer required that the tower height be lowered by adjusting the top legs downward. The site erection plan required that the towers supporting the girders be lowered and removed in the following order: tower supporting girder A, then B, then D, then C, then F, then E, and then G. The decedent and his coworkers did not follow the plan nor did they follow the requirement for lowering the frame height from the top. Without incident, they lowered all of the towers at once using the adjustment capacity at the base of the towers. Using a rough terrain forklift with job-made 9-foot forks, the tower supporting girder A was removed by placing the forks under the top of the frame. Tower B was removed by placing the forks under the top horizontal aligner. The third tower in the sequence, Tower C, could not be removed with the top horizontal aligners in their current position because of space limitations span for the rough terrain forklift truck under the girder.

The decedent and his coworker told the forklift operator, who had been requested to move another construction item and had to leave the incident site, that they were going to lower the top horizontal aligners while he was gone. To lower these horizontal aligners, two diagonal braces had to be moved. It is unknown if the decedent or his coworker removed the south brace. When the decedent's coworker removed the top bolt from the north brace, the tower twisted and collapsed to the west. His coworker was either thrown from or pulled away from the falling tower by a coworker who had just arrived. The decedent fell with the tower and the top of the tower frame struck him. A nearby crane operator was alerted and assisted in raising the frame from the decedent. Reference: MIFACE Summary Case 190.

**Case 94** A 37-year-old male construction laborer died when he was struck by a resin-impregnated tube during its removal from an underground sewer pipe. The decedent was the foreman of a four-person crew that included a coworker in the manhole with him, a top man who signaled the crane operator, and a crane operator. The firm was reconstructing storm water pipelines utilizing cured-in-place pipelining technology. The resin-impregnated tube was attached to a line that was attached to a crane. The tube was placed into and dragged through the pipe using a boom truck crane and was cured in place by circulating hot water or steam through the pipe. After the material had cured, excess material was removed. It was during this removal operation that the decedent was killed. The decedent and his coworker in the manhole had scored the last piece of sewer lining material, which was approximately one and one-half to two inches thick with a gas-powered chain saw. A hole was cut into the resin material and a one-inch diameter rope was attached. The top man tied the other end of the rope to the crane hook, which was located above the top of the manhole. The workers in the manhole signaled to the top man to signal the crane operator to raise the material. This exerted tension on the rope, which had in past work operations, caused the scored resin material to crack and by using a pry bar and/or shaking the taut rope, the workers had been able to break the material, and lift the piece out of the manhole. On the day of the incident, the piece of material being removed was larger than had been scored and lifted in past operations. The piece involved in the incident was approximately 20 feet long by 6 to 8 feet wide. The piece was scored and the coworker in the manhole told the decedent to move out of the way. The decedent signaled the top man to signal the crane operator to lift and exert tension on the piece. It appeared to the coworker in the manhole that they had not scored the material deeply enough so it could break free. The top man stopped the lifting motion of the crane. The crane operator did not relieve tension on the rope. The top man told the decedent to move out of the way. The decedent decided to shake the taut rope to force the material to break as they had done previously with the smaller pieces. The liner material snapped and broke loose. The decedent was struck and thrown back, striking the manhole wall. Emergency response was called and transported the decedent to a local hospital where he was declared dead. Reference: MIFACE Summary Case 183.

**Case 95** A 33-year-old male journeyman lineman was killed when the cross arm of a 35-foot section of a wood power pole he was topping landed on his back, pinning him to the elevated bucket. A different work crew had previously cut sections off both of the cross arms and the top of the utility pole. The decedent was the foreman of the work crew which was at the site to complete the removal of the pole so new metal poles could be set. The decedent and a coworker were raised in the bucket approximately 25-30 feet. The decedent made two cuts approximately one foot apart on each side of the pole roughly 35 feet down from the top of the pole. The portion of the cross arms were still present. As he finished the cuts, the pole started to fall toward the elevated bucket. The decedent and his coworker both attempted to push the falling pole away from the bucket. The top of the pole got caught on the lower power line and then bounced up, landing on the decedent's back, pinning him to the bucket. The bucket stalled and could not be operated from either the ground or from the bucket controls. Another coworker on the ground cut the pole at its base so the top part could fall to the ground. After the pole top fell, the bucket was operational, and was lowered to the ground.

Emergency response was called and the decedent was transported to a local hospital where he died. Reference: MIFACE Summary Case 199.

**Case 96** A 48-year-old male heavy equipment operator/foreman was killed when an elevated 18-foot long, 3,500-pound dump box of a truck that was being supported by a 3/8-inch chain and front-end loader dislodged from the chain and fell onto him. The dump box had been stored outside on pallets on the ground. The firm determined that hinge brackets were to be placed in the dump box. The dump box was lifted from the pallet to mark the location for the brackets. To raise the box, a 3/8-inch chain was hooked under the dump box to the frame on the left (east) side and then looped up through a hook on the front end loader, and back down to the right (west) side where it was again hooked to underneath the dump box to the frame. The dump box was elevated approximately six to seven feet. Because west side chain was in the way of where they needed to work, the box was lowered to the ground and the decedent repositioned the west chain. The box was raised a second time, and the loader shut off. After the box was raised, the decedent and his coworker procured a 3/4-inch thick steel plate and soap stone for marking the plate/hinge position. The decedent was positioned underneath the raised box toward the center right of the box. His coworker stood outside, on the west side of the box. The decedent could not see the end of the box frame due to dirt, so he scraped the box frame with the plate to clean it. It appears he bumped the end of the chain hook he had repositioned, which caused the west side of the box to fall onto him. His coworker heard the chain fly and was knocked back and thrown to the ground. Because of injuries sustained when he was struck and thrown to the ground, the coworker used his cell phone to call the shop and ask for help. These employees came to assist in rescuing the decedent and attending to the injured coworker. The employees re-hooked the chain to the west side of the dump box and used the front end loader to raise the box from the decedent. Emergency response was called and the decedent was taken to a local hospital where he was declared dead. Reference: MIFACE Summary Case 195

**Case 97** A 45-year-old male truck driver/feller/crew leader for a road commission died when he was struck by a falling tree limb as he retreated from the tree after felling it with a chain saw. The decedent was a member of a four-person crew assigned to remove a dead tree from near a roadway. The decedent was the work crew leader. The crew gathered the necessary equipment to perform the work and drove to the worksite. There was a prison work crew at the site to help with brush collection and related work. The crew held a discussion to plan the work including whether or not to "limb out" the tree prior to felling. The decision was made to fell the tree without cutting off the limbs first. The direction chosen for felling the tree was at an (northwest) angle into the roadway. Two coworkers positioned themselves approximately 20 to 30 feet beyond what they believed would be the end of the tree in the expected falling path. The decedent operated the saw. The fourth coworker operated a front end loader. The loader was positioned at an angle partially in the road to brace the tree and to help fell the tree once the hinge was cut. The decedent made the cuts for the notch, and then made the back cut toward the hinge. The under cut significantly bypassed the notch and was through more than half the thickness of the tree. During the back cut, the decedent was positioned under the bucket of the front end loader. The tree was reported to have had limbs and weight distributed toward and perhaps over the roadway. After finishing the back cut, the decedent proceeded toward the roadway on the north side of the front end loader. As he retreated from the cutting operation, the rest of the crew noticed that the tree was beginning to fall. The crew shouted a warning. The two coworkers positioned away from the tree moved toward the decedent, who turned to look when he heard the warning. The tree rotated and fell and struck both the front end loader and the decedent, pinning him under the tree. One of the coworkers called 911 on his cell phone. The crew began to cut the limbs off of the tree to free the decedent. Emergency response arrived. The decedent was transported to a hospital and pronounced dead. Reference: MIFACE Summary Case 194.



***Manufacturing (Cases 98-99)***

**Case 98** A 50-year-old male truck driver was killed when he was lowering a warehouse dock board into place while preparing to unload pallets of finished product from a tractor-trailer to the warehouse facility. The decedent backed his truck into the bay for unloading, set the parking brake, chocked the wheels, and disconnected the brake line air supply lines. There had been both a complete and partial power outage earlier in the day. The dock board was controlled by a push button control panel, located within two feet on the left wall when facing outdoors from the inside of the building. The 5/8-inch thick plate steel dock board measured 7 feet by 5 feet with a 20-inch lip and was estimated to weigh approximately 1,700-2,000 pounds. The decedent had stepped down into the open pit area of the dock board. The decedent may have entered the pit area because it was easier to open and close the manual garage door. A possible scenario of events is as follows: The decedent may have been attempting to manually lower the dock board because of the loss of power at the facility. The decedent released the lock pin and attempted to manually lower the dock board into place. With no hydraulic pressure present due to the power outage, the dock board initiated a free fall. The decedent did not have time to react while standing in the pit and was struck and caught between the dock board and pit layout. An employee coming in to open the warehouse for morning shift personnel found the decedent outside of the dock board on the left side facing out towards the open garage door and the back of the truck. Emergency response was called and the decedent was declared dead at the scene. The MIOSHA file indicated that several employees stated that this dock board had hydraulic fluid leaks and several areas with weld cracks. A hydraulic leak also could have been a contributing factor in the incident. The dock board was tested with full power to the assembly by responding departments later on the day of the incident and found to be in working order. Reference: MIFACE Summary Case 196.

**Case 99** A 57-year-old male machinist who worked for a paper mill equipment service contractor died when he was struck by a paper roller end cap propelled by compressed air. The decedent and two coworkers were attempting to remove an end cap from a paper mill press roll to determine why the steam condensate was not coming out of the hollow roll while it was in use. The 118-inch long (without ends) by 24-inch diameter roll was supported by metal saw horses. The 23-inch diameter end cap, which weighed 300-500 pounds, was supported by a sling and a 10-ton overhead crane. The end cap had a center portion that was 19 inches wide by 4 inches thick that recessed into the roll and was 4-6 thousands larger than the interior of the roll. A flange around the outside of the end cap was approximately two inches wide and two inches thick. The end cap flange was connected to the roll by 18 retaining bolts, 3 inches long and 3/4 inches in diameter. There were six additional threaded holes in the flange. Bolts, called pusher bolts, were threaded into these holes and when tightened, pushed against the roll (not into it) causing the end cap to be forced away from the roll. Two days prior to the incident, the 18 retaining bolts had been removed from the end cap and roll. Because of a coating on the roll, the work crew did not heat the roll to aide in disassembly. Several attempts to remove the end cap with the six pusher bolts had failed. To facilitate the end cap removal, the crew attached an air valve on the cap and a gate valve and pressure gage and applied 50 psig to the inside of the roll to help push the end cap out. The crew also used penetrating oil on the outside and tapped on the cap to help move it the four inches necessary. The air pressure, penetrating oil and tapping on the cap moved the cap 1/2-3/4 inches of the necessary four inches. The crew left for the weekend and the roll remained under 50 psig for two days. Upon arriving on the incident day, the pusher bolts that had been left in the end cap had bent and mushroomed. One of the employees made new bolts. As the crew began to tighten the bolts, the end cap unexpectedly released and propelled out of the roll, causing it to swing on the sling and strike the decedent in the chest. His two coworkers were injured by shrapnel during the incident, were treated at the hospital and released. The decedent was declared dead at the scene. Reference: MIFACE Summary Case 202.

### ***Wholesale Trade***

**Case 100** A 19-year-old male laborer at a grain elevator died due to complications from a fall into a railway car hopper containing corn. The railway car was in the process of being unloaded. While wearing his fall protection harness and attached to the fall arrest on the operator work platform, the decedent had unloaded corn from some rail cars and had moved the rail cars ahead on the rail siding. He unhooked his harness and descended from the platform. Another coworker informed him that an additional two railcars required unloading. The decedent climbed up the ladder to the 16-foot high operator booth where his fall protection device and operator controls were located. The rail cars were moved into position for unloading. The decedent moved the first car ahead and the car was spotted into position over an in-ground pit. The first rail car's three bins were emptied without incident. The second rail car was spotted into position and the dump chute opened. The first bin was emptied and the decedent advanced the rail car to empty the second bin, which held 1,533 cubic feet of corn. At some point during the process, the decedent stepped off of the operator platform at the operator control booth and onto the top of the rail car. He was not attached to the fall arrest system. He fell into the corn still being dumped out the bottom and became engulfed. A coworker came into the area and saw a hard hat lying under the rail car and observed clothing in the corn still pouring from the rail car chute. This coworker ran to the dump chute and grabbed the clothing and pulled the decedent from the chute and through the approximately one-foot clearance area between the bottom of the rail car chute and the in-ground pit grating. When the decedent was clear of the rail car, this coworker began to clear the decedent's air way and began CPR. Shortly thereafter, another employee came into the area and was given instruction on how to perform CPR. EMS arrived and took over the resuscitation efforts. The decedent was transported to a local hospital where he died several weeks later from complications of the injury. Reference: MIFACE Summary Case 184.

### ***Transportation & Warehousing (Cases 101-103)***

**Case 101** A 52-year-old male tow truck driver was killed when he was pinned under a vehicle he was attempting to jump start. A vehicle driver had pulled off to the side of the road after he had thought he had run out of gas. The driver called for assistance and the decedent was dispatched to the site. After the decedent placed gas in the gas tank, the vehicle still did not start. The decedent made two attempts to jump start the vehicle by attaching jumper cables to the battery. Both attempts were unsuccessful. The decedent then tried another approach to start the vehicle. He laid down on his back on the ground in front of the vehicle to place power directly to the starter by attaching a jumper cable to the side of the starter that has a small wire on it, bypassing the gear selector. When power was supplied to the starter, the engine turned over and the vehicle lurched forward, apparently still in gear. The vehicle driver attempted to stop the forward movement of the vehicle by grabbing the front bumper, but was unsuccessful. The driver then ran to the driver's side and placed the vehicle in park. The driver tried to locate a jack on the tow truck, but could not find one. Another driver who drove by the incident stopped and called for emergency response on the CB in the tow truck. Emergency response arrived, and pushed the vehicle off of the decedent. He was transported to a local hospital where he died four days later from the injuries sustained. Reference: MIFACE Investigation Report 08MI095 and MIFACE Summary Case 204.

**Case 102** A 69-year-old male truck driver was killed when he was pinned between a 53-foot trailer and a loading dock. The decedent was an independent contractor hauling automobile parts for Company A. He had parked his trailer at a loading dock at a switching terminal and exited his truck. The switching terminal's policy was that arriving drivers must stay in their trucks while they are waiting to be unloaded. One of the switching terminal employees noticed the decedent out of his truck and told him in his native language to get back into the truck. It is unknown if the decedent responded to this request and then got out of the truck a

second time. He was standing on the ground at a dock located adjacent to the dock where his truck was parked when the incident occurred. A 53-foot trailer, driven by a switching terminal employee, was backing toward the dock when it struck and pinned the decedent against the dock. Company A's policy was that all drivers must wear a reflective vest. The decedent, dressed in dark clothes, was not wearing the required vest. Reference: MIFACE Summary Case 188.

**Case 103** A 33-year-old male truck driver was killed when he was struck by an 18-foot long 12-inch diameter water main pipe weighing 700 pounds that fell from the forks of a front-end loader as the pipe was unloaded from a trailer. There were two pipe stacks on the trailer. The pipes were stacked five high and six across with five straps over each five-stack load and cribbed with 2"x 2" wood and chocks to minimize pipe rolling. The decedent and his coworker removed the binding straps from the five-high stack of pipes at the end of the trailer. The front-end loader driver had successfully unloaded four pipes from the top of the five-high stack. The front-end loader forks were an appropriate length to lift the pipes from the trailer and transport them to the installation site. The decedent and a coworker were in the process of removing the binding straps from the second stack of pipes closest to the cab. They had unsecured passenger side binding strap from the stack of pipes closest to the rear of the trailer. Because of snow depth in front of the truck and an ice and snow-covered catwalk between the cab and trailer, the decedent took the winch bar and walked around the back of the trailer to unsecure a second binding strap. As the decedent walked on the passenger side, the front-end loader driver attempted to unload the last two pipes off of the top of the rear stack he had been previously unloading. As he removed the piping, the pipe at the edge of the fork and a piece of cribbing came off the fork, bounced on piping below it, and struck the decedent in his chest and head. His coworker ran around the trailer and yelled for someone to call 911. Reference: MIFACE Summary Case 206.

### ***Administrative & Support & Waste Management & Remediation Services***

**Case 104** A 35-year-old female temporary laborer died in 2008 from complications of a neck injury sustained when a 200 pound piece of Styrofoam fell and struck her on the head in 1999.

### ***Other Services***

**Case 105** A 57-year-old male self-employed mechanic who owned and operated an automobile repair business died when a 22,000-pound truck he was repairing rolled from two homemade work ramps. The decedent's work order was to repair the parking brake. It appears that the decedent pulled the truck up onto the ramps and left the truck in neutral, with the lights on. The ramps were eight to ten feet long and had an incline of approximately 15 degrees. The decedent had placed himself in a perpendicular direction under the passenger side of the truck on a wheeled auto creeper. The decedent did not place chocks behind the tires. As the truck rolled from the ramps, the decedent and the creeper were pulled along the floor until a large metal pipe near an overhead door stopped the creeper's movement. The decedent continued to be dragged by the truck and was then run over by the passenger side front tire.

### ***Public Administration***

**Case 106** A 38-year-old male fire fighter died when he was pinned by debris from a roof collapse. The fire scene was an abandoned, two-story single-family dwelling with a dormer. After the fire was extinguished, a four-member fire fighter team, one of whom was the decedent, entered the structure with a two-inch hose line and proceeded up the stairway to the second floor to check for people and any un-extinguished embers/fires. Another responding fire fighter who had entered through the dormer was already on the second floor. Upon arriving on the second floor, the crew found heavy steam and light smoke conditions, with several small areas that were still burning. One member of the crew extinguished these areas and then began to fog out the area by changing the nozzle to a fog pattern to blow the smoke out a nearby window to allow for better

vision and to find any nests of embers. It was during this time that the walls and dormer roof collapsed. The falling debris struck all five of the fire fighters on the second floor. It was determined that the decedent was still inside the structure. The fire fighters had to search for the decedent because his PASS device was not operational. Unable to lift the debris from the floor, they used a saw to cut several roof beams and eventually found the decedent pinned under the debris. After removing him from under the debris pile, CPR was initiated and he was taken by the fire fighters and EMS personnel to a local hospital where he was declared dead. A day after the incident, the fire department examined the structure. They found that on the second floor there was a lack of proper support for the roof section that could not have been seen with the smoke. The second floor walls were a continuance of the first floor wall studs and stopped approximately 3-feet above the second floor floorboards. A plate was nailed to the top plate of those studs and the windows and remaining wall sections were formed. The roof rafters (2x6) were then attached at the top of the wall plate and all remaining roof coverage was then attached which included roof boards, cedar shake shingles and two layers of asbestos shingles. Reference: MIFACE Summary Case 201.

## **Suicide (9)**

### ***Agriculture***

**Case 107** A 49-year-old male university professor/farmer died from a self-inflicted hanging.

### ***Construction (Cases 108-110)***

**Case 108** A 44-year-old male carpenter died due to a self-inflicted hanging.

**Case 109** A 51-year-old male construction laborer died due to a self-inflicted gun shot wound.

**Case 110** A 31-year-old male heating and cooling business owner died as a result of a self-inflicted carbon monoxide poisoning.

### ***Retail Trade (Cases 111-112)***

**Case 111** A 68-year-old male owner of a glass and mirror company died from a self-inflicted gunshot wound.

**Case 112** A 25-year-old male owner/manager of a party store died from a self-inflicted gunshot wound.

### ***Accommodation & Food Service (Cases 113-114)***

**Case 113** A 19-year-old male fast food worker died due to a self-inflicted gun shot wound.

**Case 114** A 21-year-old male soldier who was working at a hotel died due to a self-inflicted hanging.

### ***Public Administration***

**Case 115** A 38-year-old male border patrol agent died of a self-inflicted gun shot wound.

## **Toxic Exposure (2)**

### ***Agriculture***

**Case 116** A 59-year-old male employee at a fruit storage facility died when he entered a controlled atmosphere (CA) storage room containing apples. Its atmosphere consisted of less than 3% oxygen. The storage room had a large outer door and an interior aluminum door, which was sealed with caulking and weather stripping. To maintain the atmosphere but still allow for visual observation of the produce, a 2-foot by 3-foot

Plexiglas window was attached to the aluminum door by 18 bolts/wing nuts. The decedent removed the wing nuts and the Plexiglas window and climbed through the opening and entered the CA room. Another company employee found him collapsed on the floor next to a wood apple bin. A bag of apples was found next to his body. The company employee leaned through the opening into the CA room, grabbed the decedent by his coat, pulled him to the opening of the CA room, and checked for a pulse. He did not find a pulse. The company employee left the area to call the office to have them call for emergency response. Upon returning to the decedent, he took a deep breath, grasped the decedent under his arms and pulled him through the opening and out of the room. A bag of a different kind of apple was found on a forklift parked in the building. The company employee attempted CPR after he pulled the decedent out of the CA room but was unsuccessful in resuscitating him. Emergency response arrived and he was declared dead at the scene. The Plexiglas window was found leaning against a wall with the wing nuts nearby. Reference: MIFACE Summary Case 208.

### ***Manufacturing***

**Case 117** A 54-year-old male machinist died from an acute asthmatic attack complicated by pneumonia and other medical conditions. He worked with Jones Shipman grinders and had exposure to soy-based lubricant mist, which induced severe shortness of breath. While at work he had difficulty breathing and was driven to the hospital by a coworker. He had worked at the company for three months and stated that he had the difficulty breathing prior to admission for approximately five to seven weeks.