CONSTRUCTION
FATALITY DIGEST

QUARTERLY REPORT
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HASLAM COLLEGE OF BUSINESS
THE UNIVERSITY OF TENNESSEE, KNOXVILLE

CONSTRUCTION INDUSTRY
& RESEARCH POLICY CENTER

"All types of falls (roof, ladder, structure, opening, etc.) accounted for 46.0% (57 events) in the fourth quarter of 2016"

Roof Falls Lead All Fatal Construction Events

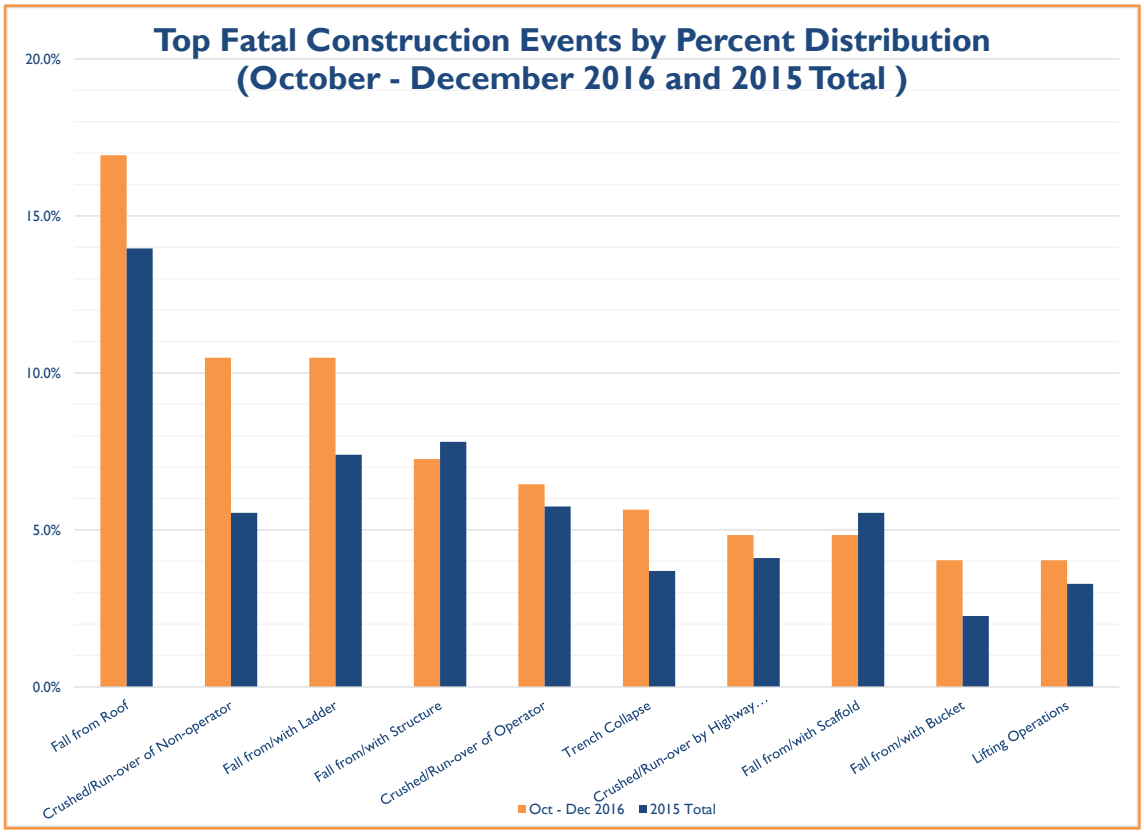
"Fall from Roof" led all categories with 21 events (16.9%) of the 124 events. This is up slightly from the previous quarter (15.2%). "Fall from Roof" for 2015 totaled 68 events (14.0%).

"Crushed/Run-over of Non-operator" jumped to the second leading fatal cause for the fourth quarter. This increased from 4.4% (in the previous quarter) to 10.5% (13 events) for the current quarter.

"Fall from/with Ladder" also tied for the second leading cause with 13 events (10.5%). "Fall from/with Structure" accounted for 9 events (7.3%), followed by "Crushed/Run-over of Operator" with 8 events (6.5%). Rounding out the leading causes for the quarter was "Trench Collapse" with 7 events (5.6%).

All types of falls (roof, ladder, structure, opening, etc.) accounted for 46.0% (57 events) in the fourth quarter of 2016. This is a similar to 41.7% (203 events) in 2015.

Two areas reflected a significant difference in reported percentages from 2015: "Crushed/Run-over of Non-operator" increased from 5.5% to 10.5% and "Fall from/with Ladder" increased from 7.4% to 10.5%. Other areas were fairly consistent with 2015 percentages.



Regional Breakdown

A total of 124 events were reported from the regions in the fourth quarter of 2016. Of these, 29.0% came from Region 4 (36 events), 13.7% (17 events) came from Regions 2 and 5 each, and 9.6% (12 events) from Region 6.

Of these fatal events 67% (83 events) were reported from Federal OSHA states, while 33% (41 events) occurred in State Plan states.

The breakdown by state shows Florida and New York with the greatest number of reports, 12 each (9.7%), followed by Texas with 10 (8.1%), and California with 8 (6.5%).

Fatal Events Reported by OSHA Region

October to December 2016

Region	# of Cases	Percent
1	8	6.5%
2	17	13.7%
3	7	5.6%
4	36	29.0%
5	17	13.7%
6	12	9.7%
7	7	5.6%
8	9	7.3%
9	10	8.1%
10	1	0.8%
Total	124	100.0%

Fatal Events by NAICS Code

A breakdown of top reported fatal events by NAICS code shows "Roofing Contractors" at the top with 16.1% (20 events) of the total events. Other top codes are "Electrical Contractors" with 9.7% (12 events), followed by "Highway, Street, and Bridge Construction" contractors with 8.1% (10 events), and "All Other Specialty Trade Contractors" with 8.1% (10 events).

Fatal Events by NAICS Code

Code	Description	# of Cases	Percent
238160	Roofing Contractors	20	16.1%
238210	Electrical Contractors	12	9.7%
237310	Highway, Street, and Bridge Construction	10	8.1%
238990	All Other Specialty Trade Contractors	10	8.1%
238320	Painting and Wall Covering Contractors	9	7.3%
238910	Site Preparation Contractors	9	7.3%
236220	Commercial and Institutional Building Construction	6	4.8%
237110	Water and Sewer Line and Related Structures Construction	6	4.8%
238120	Structural Steel and Precast Concrete Contractors	6	4.8%
236118	Residential Remodelers	5	4.0%
236210	Industrial Building Construction	4	3.2%
237120	Oil and Gas Pipeline and Related Structures Construction	4	3.2%
238130	Framing Contractors	4	3.2%
238220	Plumbing, Heating, and Air-Conditioning Contractors	4	3.2%
236115	New Single-Family Housing Construction	3	2.4%
238110	Poured Concrete Foundation and Structure Contractors	3	2.4%
238390	Other Building Finishing Contractors	3	2.4%
237130	Power and Communication Line and Related Structures Construction	2	1.6%
238350	Finish Carpentry Contractors	2	1.6%
238150	Glass and Glazing Contractors	1	0.8%
238310	Drywall and Insulation Contractors	1	0.8%
		124	100.0%

Top Construction Standard Violations During 2016

Of the 520 events for the calendar year 2016 reported to and examined by CIRPC, 282 reported citations issued*. In the 282 cases there were 967 violations of OSHA standards. The average number of violations per case with citations issued was 3.43. For the three previous calendar years, 2013, 2014, and 2015 the average number of violations per case was 3.38, 3.86, and 3.24 respectively.

The "Fall Protection" standard is the top violation for the year with 64 occurrences, followed by "Scaffolding" with 48 and "Ladders" with 44.

When comparing the running total of 2016 calendar year violations with OSHA's top standards violated in Fiscal Year 2016 (per www.osha.gov), there are similarities. "Fall Protection", "Scaffolding", "Ladders", "Hazard Communication", "Electrical, General Requirements", "Respiratory Protection", and "Powered Industrial Trucks" appear on both CIRPC's and OSHA's list.

Top OSHA Standard Violations Reported

Rank	Std #	Description	# of Occurrences
1	1926.501	Fall Protection	64
2	1926.451	Scaffolding	48
3	1926.1053	Ladders	44
4	1926.21	Safety Training and Education	38
5	1904.39	Reporting Fatalities & Multiple Hospitalization Incidents	35
T6	1926.651	Excavation	32
T6	5a1	General Duty Clause	32
8	1926.503	Fall Protection Training	31
9	1926.502	Fall Protection Systems Criteria and Practices	27
10	1926.20	General Safety & Health Provisions	26
11	1910.1200	Hazard Communication	23
12	1926.416	Electrical, General Requirements	20
T13	1926.454	Scaffold Training	19
T13	1926.652	Excavation, General Requirements for Protection Systems	18
T13	1926.1204	Confined Spaces in Construction	16
16	1926.100	Head Protection	15
T17	1926.1060	Stairways and Ladders - Training Requirements	14
T17	1926.1412	Crane/Derrick Inspection	14
T19	1910.134	Respiratory Protection	13
T19	1910.178	Powered Industrial Trucks	13

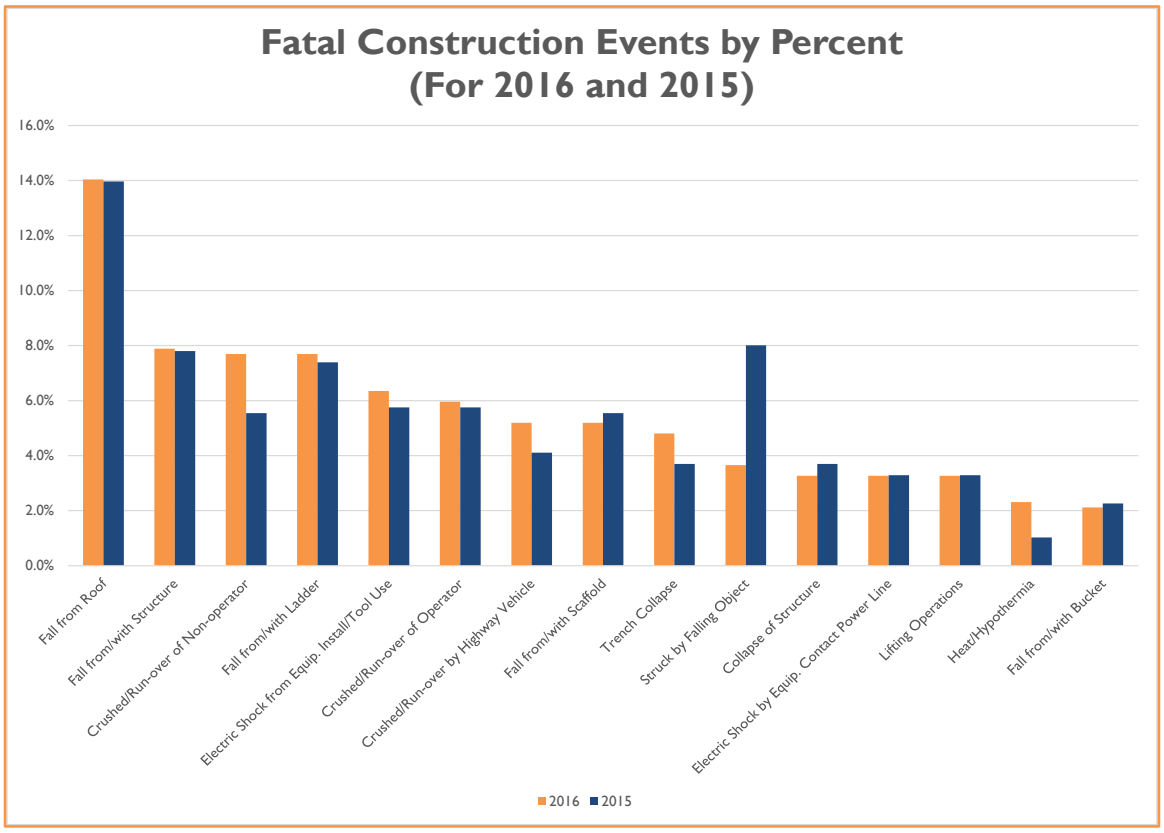
* Inspectors have up to six months to issue citations on a fatality. As a result, citations may not yet have been issued for some of these cases.

2016: The Year in Review

There were 520* events reported by OSHA to CIRPC for the calendar year compared to a total of 487 for 2015. In 2016, roof falls led all reported fatal events with 14.0% (73 events) of the total. Roof falls also led all events in 2014 and 2015.

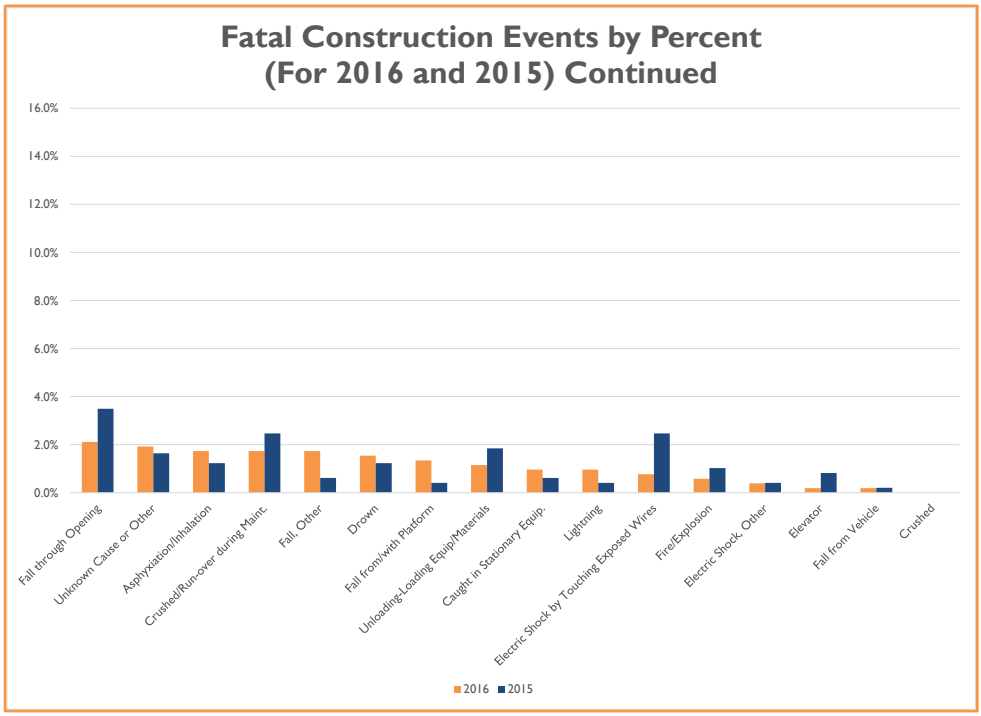
Rounding out the top events for 2016 are "Fall from/with Structure" with 7.9%, followed by "Crushed/Run-over of Non-operator" at 7.7%, "Fall from/with Ladder" with 7.7%, and "Electric Shock from Equipment Install/Tool Use" with 6.3%.

When comparing the fatal events from 2015 with the 2016 events, one can see some fairly large ranking changes for certain events ("Struck by Falling Object", "Crushed/Run-over of Non-operator", and "Electric Shock by Touching Exposed Wire"). In 2015 "Struck by Falling Object" ranked second with 8.0% of the total events, whereas in 2016 its ranking decreased to tenth with 3.7% of the total events. "Crushed/Run-over of Non-operator" saw an increase - - from 5.5% (ranked seventh) in 2015 to 7.7% (ranked third) in 2016. "Electric Shock by Touching Exposed Wire" decreased from 2.5% (ranked sixteenth) to 0.8% (ranked twenty-sixth) of the total.



* - The 520 events were OSHA jurisdiction cases only and may not total the fatal construction events reported by others sources.

2016: The Year in Review (Continued)



Falls (all types) again topped the list of grouped fatal events with 42.3% of all events in 2016. This was a slight increase of 0.6% over the total from 2015. Crush/Run-overs (20.6%) and Electrocutions (10.4%) rounded out the top three grouped fatal events. The top three grouped events accounted for over 73% of all the fatal events in 2016.

Grouped Fatal Construction Events Comparison

Grouped Event	2016	2015	2014
All Falls	42.3%	41.7%	42.6%
All Crush/Run-overs	20.6%	17.9%	18.7%
All Electrocutions	10.4%	11.9%	13.4%
Other Events	26.7%	28.5%	25.3%

Trends in Fatalities – Top Ranking Events by Regions

The leading fatal causes for each region reveals roof falls lead the way in a majority of the regions. Ladder falls lead two regions with "Crushed/Run-overs of Operator" and "Crushed/Run-over by Highway Vehicle" tied each leading one region.

Region 4 had the greatest number of fatal events (145) and the most "Falls from Roof" with 24 events (16.6%).

The "Fatal Four", OSHA's term for the fatal events that includes: Falls, Electrocutions, Struck by Object, and Caught-in/between, account for almost all the ranked events in the chart below.

Fatal Event Rankings by Region (2016)

Ranks	Region 1	# of Events	% of Total	Region 2	# of Events	% of Total
1	Fall from/with Ladder	6	27.3%	Fall from Roof	10	22.2%
2	Crushed/Run-over of Non-Operator	4	18.2%	Fall from/with Scaffold	6	13.3%
3	3 Way Tie	2	9.1%	Fall from/with Structure	5	11.1%

Ranks	Region 3	# of Events	% of Total	Region 4	# of Events	% of Total
1	Fall from/with Ladder	7	15.2%	Fall from Roof	24	16.6%
2	Fall from Roof	7	15.2%	Crushed/Run-over of Non-operator	15	10.3%
3	Fall from/with Structure	5	10.9%	Fall from/with Structure	11	7.6%

Ranks	Region 5	# of Events	% of Total	Region 6	# of Events	% of Total
1	Fall from Roof	6	10.2%	Fall from Roof	11	11.2%
2	Crushed/Run-over of Operator	5	8.5%	Electric Shock by Equip/Tools	10	10.2%
3	Crushed/Run-over by Highway Vehicle	5	8.5%	Crushed/Run-over by Non-operator	9	9.2%

Ranks	Region 7	# of Events	% of Total	Region 8	# of Events	% of Total
1	Crushed/Run-over by Highway Vehicle	3	11.1%	Crushed/Run-over of Operator	3	12.5%
2	Fall from/with Structure	3	11.1%	Fall from Ladder	3	12.5%
3	Trench Collapse	3	11.1%	Lifting Operation	3	12.5%

Ranks	Region 9	# of Events	% of Total	Region 10	# of Events	% of Total
1	Fall from Roof	5	12.8%	Fall from Roof	4	26.7%
2	Crushed/Run-over of Operator	4	10.3%	Trench Collapse	3	20.0%
3	Fall from/with Structure	4	10.3%	8 Way Tie	1	6.7%

Summary of Fatal Events

Below is a random selection of 35 fatal event summaries from the 124 cases reported for the quarter. These narratives are taken directly from the reports filed by the CSHO with only minor editing.

CATEGORY: ROOF FALLS

Inspection Number: 1170131
The employees were applying a waterproof membrane over a 2/12 pitch metal roof. One employee was moving material on the roof when he stepped onto a skylight causing the skylight to break. The employee fell 30 feet to the concrete below.

Inspection Number: 1166913
The decedent was on the roof receiving materials being dropped by a crane when he stepped back into a skylight falling 15-20 feet to the ground below. It was reported the skylight was marked with orange paint.

Inspection Number: 1147704
Employees were laying down new metal decking on the roof of a commercial building. The employees were using articulated booms as a means to access the deck 45 feet above the ground. The victim slipped and fell 45 feet while attempting to get into the lift from the metal decking roof.

Inspection Number: 1156180
A roofer fell 16-feet 8-inches through an open hole on the roof while performing roofing work. Witness reports state no fall protection was observed on the employee prior to his fall.

Inspection Number: 1145642
An employee was installing new metal roofing panels when he fell through the roof to the concrete below.

CATEGORY: OTHER FALL EVENTS

Inspection Number: 1173061
The employees were putting fascia board on the edge of a two story roof. The victim lost his footing on the ladder and fell 15 feet.

Inspection Number: 1155302
An employee fell from a ladder and through a second story window, when he lost his balance trying to remove a nail.

CATEGORY: OTHER FALL EVENTS (Continued)

Inspection Number: 1156963
Employee was installing Tyvek from either a ladder or baker-style scaffold at a height of approximately 6 feet. Employees working in the area heard "something crash" and went to investigate. They found the victim lying on the ground unresponsive with an apparent head injury.

Inspection Number: 1142497
The victim climbed on a scaffold without tying himself off. He was installing vinyl around the glass frame at an elevated height of approximately 20 feet when he fell.

Inspection Number: 1166073
Two workers were lifted in a wooden box with a rough terrain forklift approximately 60 feet to access a window on the outside of a hotel under construction. The wooden box tipped over and fell from the forklift tines, one employee was pronounced dead on scene, and the other employee was hospitalized.

Inspection Number: 1157834
A worker fell 20 to 30 feet from the wood pallet resting on the elevated forks of a rough terrain forklift. The entire fork assembly became detached from the machine causing the assembly, pallet, and worker to fall.

Inspection Number: 1168967
Employee was working on rough-in electrical system for a pole barn. Work involved running metal clad housing over the truss work using a scissor lift. In the process of running the housing through the length of the pole barn, the employee exited the scissor lift, first moving vertically to reach the truss work and then proceeded horizontally across 2x4's spanning the length of the pole barn without fall protection. When the employee was approximately 16 feet horizontally from the scissor lift cage, the 2x4 he was standing on broke and the employee fell approximately 21 feet vertically to the floor resulting in the fatality.

Inspection Number: 1149113
Artists were painting a large mural on the facade of a building from a suspended scaffold. The scaffold fell which resulted in one fatality and one hospitalization.

CATEGORY: ELECTROCUTIONS

Inspection Number: 1162474
An employee was installing metal cable for a fiber optic line on a utility pole adjacent to 35 kV electric lines. As the employee was attempting to secure the metal cable to the utility pole, the metal cable made contact with an electrical power line which electrocuted the employee.

CATEGORY: ELECTROCUTIONS (Continued)

Inspection Number: 1160360
Employee was installing rain gutters on a new condo complex when his metal ladder came into contact with overhead power lines.

Inspection Number: 1154437
A fatality and a hospitalization occurred during a fiber optic cable installation. The cable installers had been subcontracted to install a cable line. During installation an electrical line disconnected from the ground. The line came in contact with the employee in the bucket lift causing an electrocution and then striking the company's truck as the second employee was standing nearby, the second employee was hospitalized resulting in an amputation.

Inspection Number: 1142353
An employee was pulling a ground wire through a service entrance section switchgear/panelboard, when he accidently contacted the live bus bar in the back of the switchgear and was electrocuted.

CATEGORY: STRUCK BY, RUN OVER, CRUSHED BY OPERATING CONSTRUCTION EQUIPMENT/VEHICLE

Inspection Number: 1164141
The decedent was working as a laborer on a road crew when a dump truck backed over him causing his death. The county road crew was in the process of widening the road when the accident occurred.

Inspection Number: 1151705
The employee was in the process of guiding back a tractor trailer into a loading dock area. He was trying to hold up a dock plate, when he was caught between the tractor trailer and the loading dock area, fatally crushing him.

Inspection Number: 1157851
Employee was operating a lift and became pinned between cage bar and the support beam he was working on. The employee was hospitalized and succumbed to injuries.

Inspection Number: 1142491
Two employees went to pick up a traffic control message board. While connecting the message board to the pickup they were driving, a tractor trailer veered off the inside of the roadway then overcorrected coming back across the lanes of traffic and striking the two employees killing them both. One employee was knocked into the embankment and the other employee was knocked into the bridge concrete supports and then dragged.

CATEGORY: STRUCK BY, RUN OVER, CRUSHED BY OPERATING CONSTRUCTION EQUIPMENT/VEHICLE (Continued)

Inspection Number: 1156125
The victim was working inside the building (lobby area) with another co-worker. A driver of a vehicle crashed into the building and fatally struck the victim.

Inspection Number: 1145496
The employee was facing traffic using a concrete saw inside the traffic control barrels. An SUV drove around semis, crossed from the far left lane to the far right lane. Then drove into the work area striking a traffic drum and then striking the employee. The employee struck the work truck and then flew approximately 100 feet and then came to rest on the pavement. The SUV traveled approximately 1000 feet down the road and stopped in the shoulder area next to the far left lane.

Inspection Number: 1163751
A carpenter was walking across the parking lot of a construction site for a tunnel project while snow clearing was taking place. Snow in the parking lot was being cleared using a rough terrain powered industrial vehicle (PIV) with a shovel attachment. As the victim was walking across the parking lot the PIV backed over the victim causing fatal injuries.

CATEGORY: OTHER FATALITY CAUSES

Inspection Number: 1168232
Two employees were working on the roof of a residential home. The victim proceeded to the basement where the generator was located. An undisclosed amount of time later, the co-worker called for the victim and did not receive any response. The co-worker called 911 and then proceeded into the basement to try and pull the victim out. When first responders arrived, they found the co-worker in the basement also unresponsive. Both individuals were taken to nearby hospitals where the victim later passed away due to asphyxiation.

Inspection Number: 1145085
Crew of two workers were repairing a concrete culvert near the edge of a lake. One worker walked off to the truck for tools and returned to find the other worker missing. His hat was seen floating in water. Rescuers later pulled the second worker from the water, who appeared to have drowned.

Inspection Number: 1151690
Two employees were repairing a leak in a pipeline. While digging, the excavator struck the pipeline which resulted in a fire and explosion that fatally injured both employees.

CATEGORY: OTHER FATALITY CAUSES (Continued)

Inspection Number: 1165890
An employee was struck by a steel rebar cage. The cage was hoisted approximately 40 feet in the air when the nylon strap came unstrapped and the cage fell striking the employee directly on the head.

Inspection Number: 1144554
Two employees were installing a light pole with a fixture on it. The fixture broke free from the pole and fell, striking both employees. One employee was fatally injured from the fixture and the other was hospitalized.

Inspection Number: 1146849
An employee of a masonry contractor, working on a brick facade at the front of the building, was struck and killed by a 60 pound roller. The roller was being used during a roofing operation and fell 74 feet from the roof above and struck the victim.

Inspection Number: 1164889
A construction crew was working on a new house. One of the workers was digging a trench from the house to the sewer line, using a backhoe. The victim climbed out of the backhoe and went down into the unprotected trench. The trench sides collapsed in on top of him. The victim was pronounced dead on the scene. The trench was approximately 12 feet deep.

Inspection Number: 1158773
The deceased was trying to move a vertically stacked pile of 16 pieces of 12 foot by 4 foot drywall, when the stack shifted and he was pinned between the stack and a door jam.

Inspection Number: 1163929
The employee was cutting the straps on a pallet that held partitions for office cubicles. The employee cut with too much force and stabbed himself in the heart.

Inspection Number: 1161093
Employee entered a permit required confined space (tank) to begin abrasive blasting. A short time later, he was found unresponsive. Employee was extricated from the tank via rescue team and transported to the hospital where he passed away.

Inspection Number: 1161597
Construction workers were working in a commercial building removing an interior wall when the wall began to collapse resulting in the building collapsing, trapping and killing one of the workers.

Word Cloud

The word cloud to the right was created from the narratives on the previous pages. The size of the each word depends on the number of times it appears in the narratives. With roof falls the leading fatal event, it's not surprising "roof", "victim", "feet", and "fell" are the largest words.

feet
roof
victim
fell
working
ground
building
line
metal
work
struck
installing
hospitalization
construction
contact
concrete
striking
traffic
scaffold
protection
electrical
vertically
stack
digging
barn
commercial
decking
house
tractor
terrain
repairing
tank
truck
lift
hospitalized
forklift
board
horizontally
edgepipeline
vehicle
story
lane
cage
skylight
ladder
trench
road
drywall
fixture
injured
window
electrocuted
installation
crew
injuries
roller
box
fiber
elevated
pinned
electrocution
fatal
fatality
responsive
unresponsive
climbed
broke
height
backhoe
truss
fall
foot
lines
water
pallet
running
roofing
trailer
loading
head
crashed
condo
hotel
home
hospital
caught
carpenter
pavement
embankment
clad
Construction
unprotected
paint
amputation
excavator
collapsing
industrial
extricated
contacted
overhead
dump
hoisted
beam
applying
interior
laborer
receiving
generator
powered
bucket
operation
culvert
connecting
baker-style
taking
machine
painting
suspended
overhead
material
bridge
pulled
electric
residential
roadway
crushed
stacked
Crew
jam
glass
saw
leak
nail
pitch
roofer
collapse
strap
lifted
installers
sewer
operating
crane
floor
switchgear
deck
blasting
falling
permit
rebar
tipped
frame
contractor
cutting
gutters
short
confined
pile
unstrapped
steel
dragged
Collapsed
exposure
inspection
Work
Lift
Resident
helper
watercraft
Wall
Unpaved
Masonry
Roofer
Roofers
Installers
Installer
Installing
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