



U.S. Coast Guard - American Waterways Operators Annual Safety Report

National Quality Steering Committee Meeting

December 12, 2017

Established Safety Metrics

For 17 years, the National Quality Steering Committee has used three measures to track overall trends in safety and environmental protection. While not all-encompassing, the measures are considered useful indicators of towing industry trends. The measures are:

- Crew fatalities per 100,000 towing industry workers.
- Gallons of oil spilled from tank barges per million gallons transported.
- The number of towing vessel casualties (overall and by incident severity).

This report contains towing industry data and measures for calendar years 1994 to 2016.

This report also includes summary statistics on crew member injuries, which the National Quality Steering Committee began tracking in 2006, for calendar years 2006 to 2016.

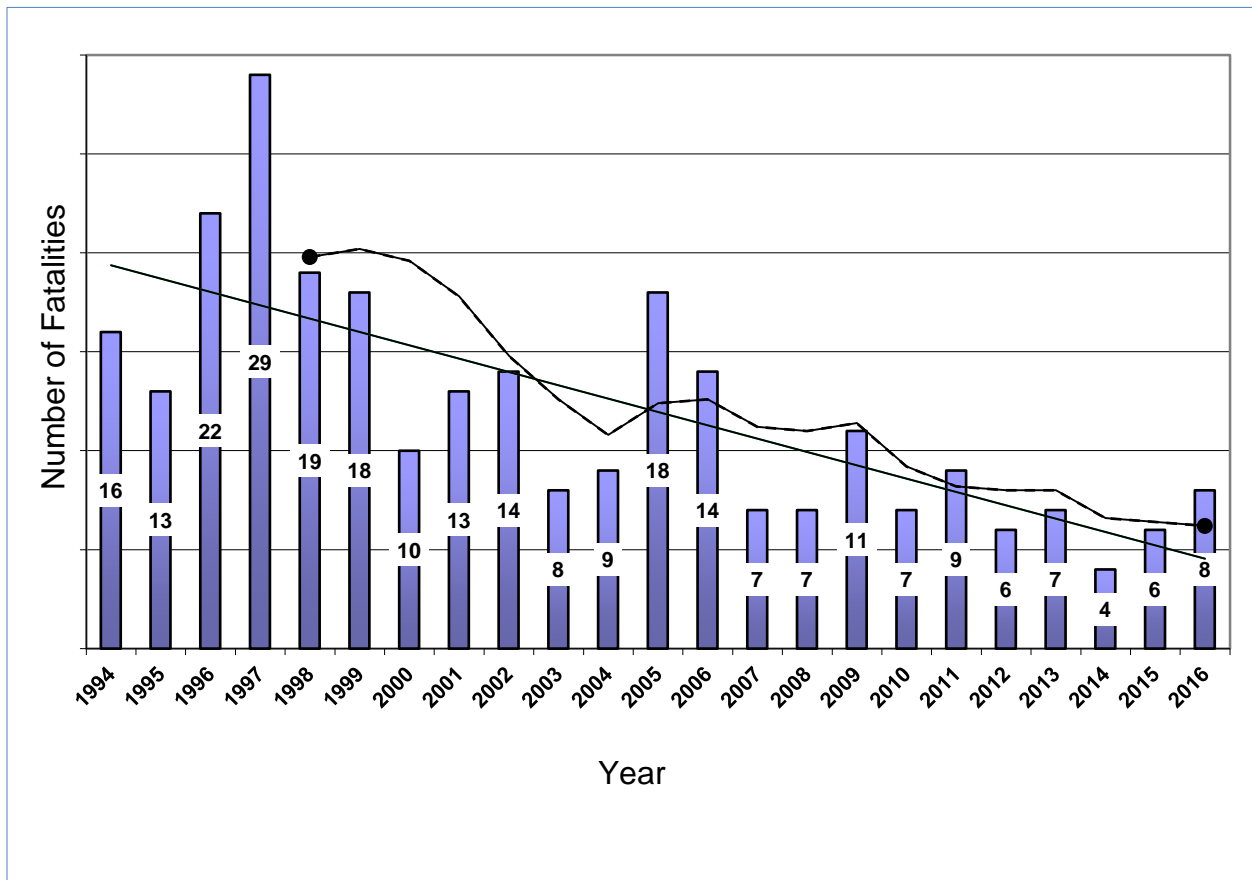
Crew Fatalities

In 2016, there were eight operational towing vessel crew fatalities¹. While fifteen deaths were reported to the Coast Guard aboard towing vessels in 2016, only eight were directly related to towing vessel operations. The other seven deaths were due to existing medical conditions (5) and accidental overdose (2).

Of the eight crew fatalities, one casualty accounted for three deaths. In this case, a towing vessel allided with a spudded barge at a bridge construction site and sank. After vessel salvage and investigation it was determined one crewman was crushed below deck upon impact and two others drowned after the vessel sank. In separate incidents, three crewmembers were crushed between objects (one fell between a tug and barge, one fell between two barges, and another was caught between the rake of one barge and another when mooring into a fleeting area). Two other crewmen died as a result of falling into the water (one fell while working on a fleeting area barge and another fell or jumped into the water attempting to escape from a capsizing towing vessel).

Chart 1 shows the annual fatality count, the linear trend line and the 5-year moving average for calendar years 1994 through 2016.

Chart 1 - Crew Fatalities by Calendar Year



¹The death of a crew member serving onboard a towing vessel or barge is considered a crew fatality. A missing crew member is also recorded as a crew fatality. Deaths due to existing medical conditions, natural causes, and deaths of external parties, shipyard workers or shore-side workers are excluded from this measure.

Chart 2 shows the distribution of crew fatalities by accident type. The largest number of crew fatalities is attributed to falls overboard (77 of 158, 49%). The next largest group of fatalities is attributed to asphyxiation (25 of 158, 16%).

Chart 2 - Crew Fatalities by Accident Type (CY 2000 – 2016)

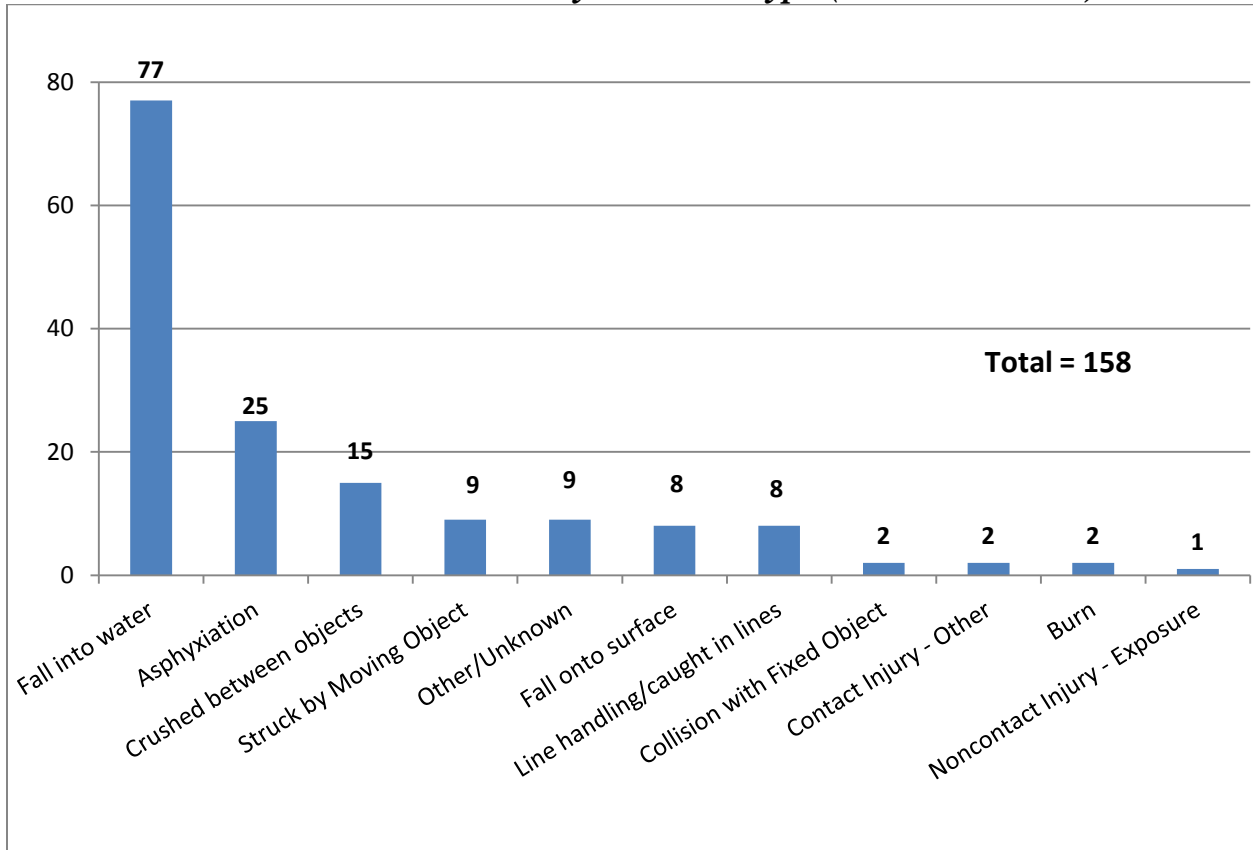
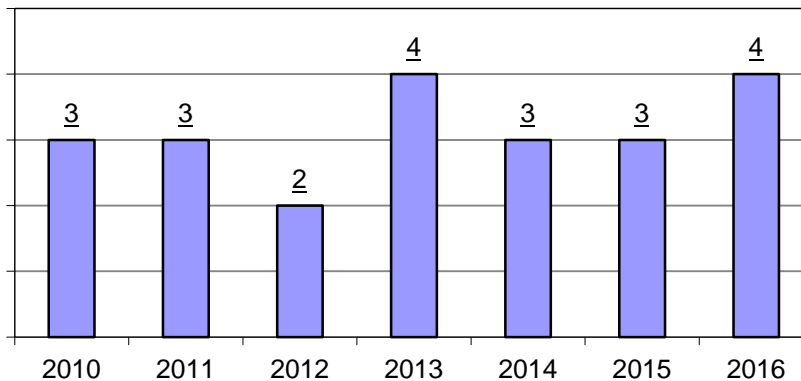


Chart 3 shows the number of fatalities resulting from falls overboard for calendar years 2010 to 2016. While the annual number of fatalities for all accident types has steadily decreased, the number of fatalities due to falls overboard has remained constant.

Chart 3 - Crew Fatalities due to Falls Overboard



Crew Fatality Rate

While the 2016 projected crew fatality rate per 100,000 FTE is nine, there were actually only eight operational crew fatalities, one less than the model projected. Chart 4 shows the crew fatality rate from 1994 to 2016. The crew fatality rate is calculated using the “Mercer Model”, which was developed with AWO-funded research. The denominator for this rate is derived from the number of towing vessels in operation, as reported by the U.S. Army Corps of Engineers (USACE). The most recent data available is one calendar year behind the Coast Guard data. The 2015 USACE data was delayed due to new publication software and as a result the final data was presented in a different format than in previous years. Additional time was required to review the raw data and produce a data set comparable to that used in previous years.

Chart 4 - Crew Fatality Rate per 100,000 FTE²

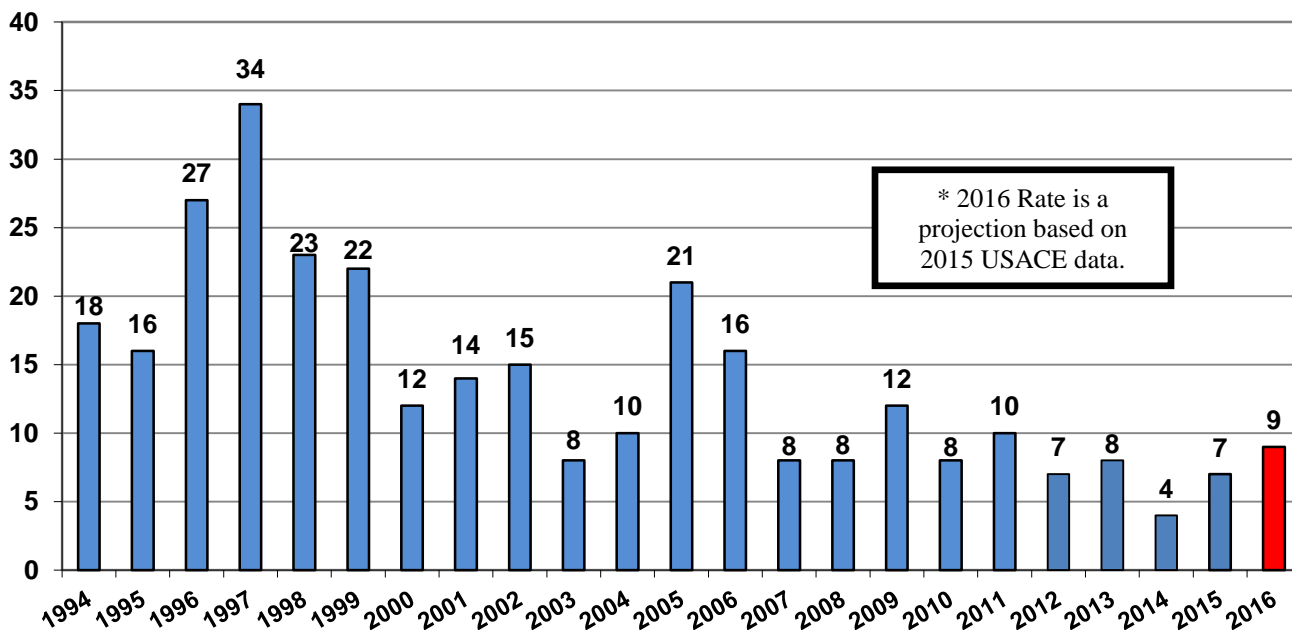


Table 1 shows the fatality rates per 100,000 FTE calculated by the Bureau of Labor Statistics (BLS) for all workers from 2012 to 2015³. Additionally, Table 1 shows the fatality rates for the transportation sector and towing industry. For 2015 the towing industry fatality rate is 6.7, half the rate of the transportation sector and double the rate for all fatal work injuries.

Table 1 – Comparison of Worker Fatality Rates

Worker Fatality Rates per 100,000 FTE	2012	2013	2014	2015
Bureau of Labor Statistic (BLS), All Fatal Work Injuries	3.4	3.3	3.4	3.4
BLS, Transportation Sector Fatal Work Injuries	14.6	14.4	15.4	14.7
Towing Industry, Crew Member Operational Fatal Work Injuries	6.7	7.8	4.4	6.7

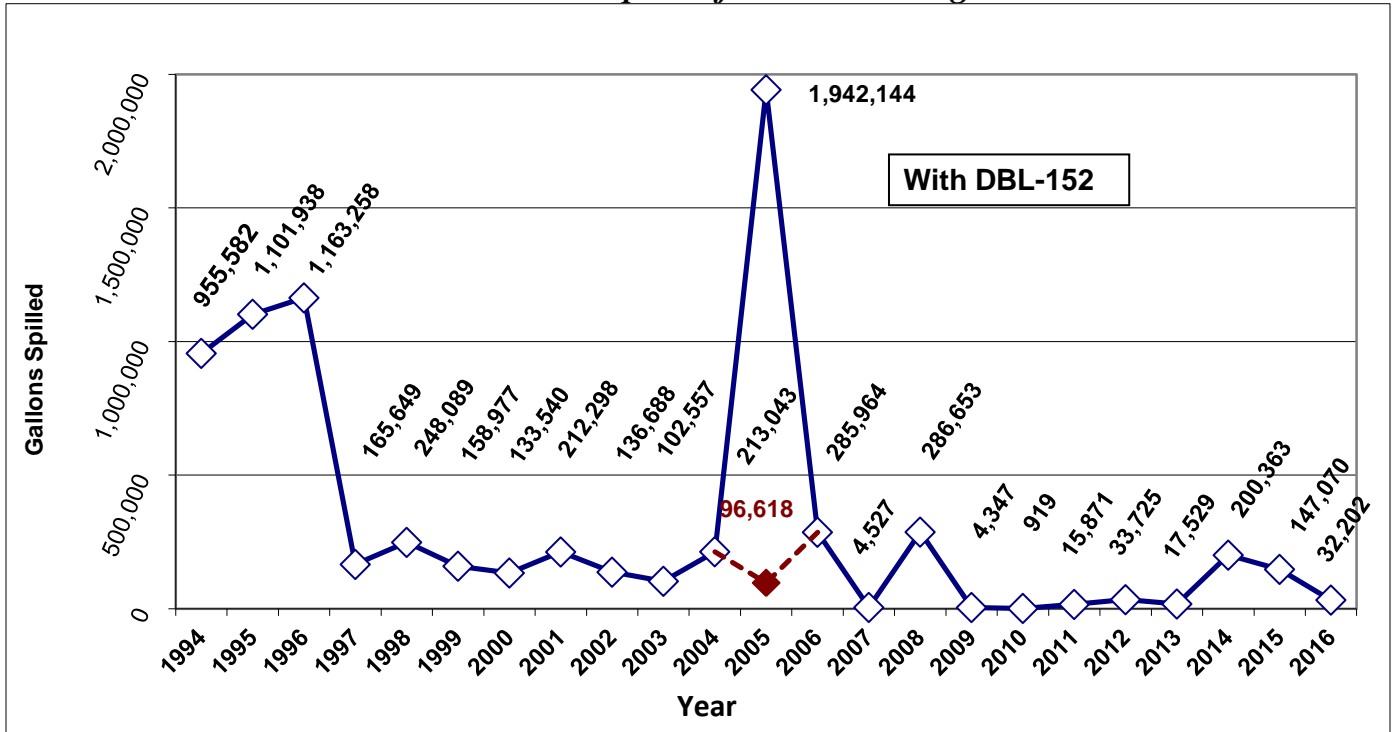
² An FTE or Full Time Employee is the equivalent of one person working a 40-hour work week, for 50 weeks of the year.

³ <https://www.bls.gov/iif/oshwc/cfoi/cfch0014.pdf>

Oil Spill Volumes

According to Coast Guard records, 32,202 gallons of oil was spilled as a result of 64 tank barge pollution incidents in 2016. Chart 5 shows the total gallon quantity of oil spilled from tank barges for calendar years 1994 to 2016.

Chart 5 – Oil Spilled from Tank Barges



The largest spill was the result of an allision between a tank barge and the Subsea7 dock in Port Isabella, TX. The UTV CAPT JIM GREEN was attempting to dock pushing two tank barges when overtaken by wind. The allision resulted in a 6' X 2' gash opening the #3 cargo tank above the waterline, releasing 24,948 gallons of ultra low sulfur diesel into the channel. This spill accounted for 77% of the total volume spilled in 2016.

The second largest spill was the result of an allision between the UTV AMY FRANCES, pushing six tank barges, and the Vicksburg-Vidalia Dual Bridge. The allision and damage resulted in the release of 4,696 gallons of slurry oil into the Mississippi River. This spill accounted for 15% of the total volume spilled in 2016.

The third largest spill of 1,470 gallons, and only other spill greater than 1,000 gallons, was the result of overfilling a tank barge at Houston Fuel Oil Tanking Dock #7 during cargo operations. This spill accounted for 5% of the annual total.

These three spills accounted for 97% of the total volume of oil spilled from tank barges in 2016. Table 2 shows the number of oil spills by spill size.

Table 2 – Oil Spills by Spill Size, CY2016

Gallons of Oil Spilled	Number of Oil Spill Events (spill amounts in gallons)
More than 1000	3 (25k, 4.7k & 1.5k)
101 to 1000	2 (380, 251)
1 to 100	49
Less than 1	10

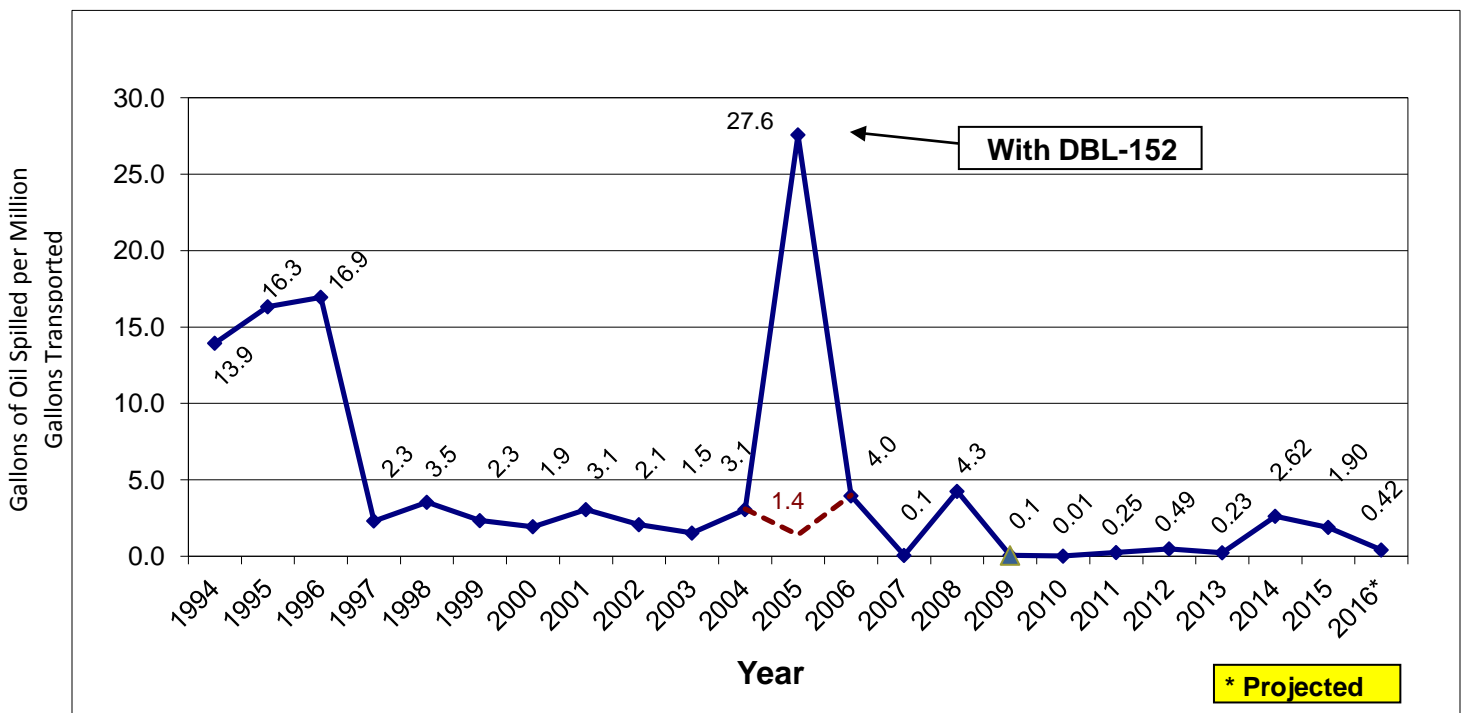
Oil Spill Rate

The projected oil spill rate for 2016 is approximately one gallon of oil spilled per 2,160,000 gallons transported, or 0.42 of a gallon spilled per million gallons of oil transported. Chart 6 shows the oil spill rates from 1994 to 2015 and the projection for 2016.

The tank barge oil spill rate is calculated using Coast Guard spill data, along with data from the annual U.S. Army Corps of Engineers (USACE) publication “*Waterborne Commerce of the United States*,”⁴ Part 5, Table 2-3. The latest publication available is for calendar year 2015; therefore, the 2016 spill rate is a projection based on 2015 data.

In 2015, the USACE reported 283.0 million short tons, or approximately 77.5 billion gallons, of oil was transported by barge on U.S. waterways. That amount represents 81.7% of all oil and petroleum products carried on domestic waterways. In 2015, the amount of oil transported by barge increased by 4.1 million short tons or 1.1 billion gallons. This represents a 1.0% increase over 2014.

**Chart 6 - Gallons of Oil Spilled by Tank Barges
Per Million Gallons Transported**



The 1.0% increase in the amount of oil transported by barge and the decreased amount spilled in 2015 resulted in a decrease from 2.6 to 1.9 in the oil spill rate. If 2015 oil transportation volumes remain the same for 2016, then the projected rate for 2016 will be 0.42 gallons of oil spilled per million gallons transported, a significant improvement over 2014 and 2015 oil spill rates.

Overall, the oil spill rate continues to be relatively low considering the volumes transported, and the fact that oil transportation volumes by barge have steadily increased since 2011 (a 22% increase over the last 5 years).

⁴ <http://www.navigationdatacenter.us/wcsc/pdf/wcusnatl15.pdf>.

Severity of Vessel Incidents

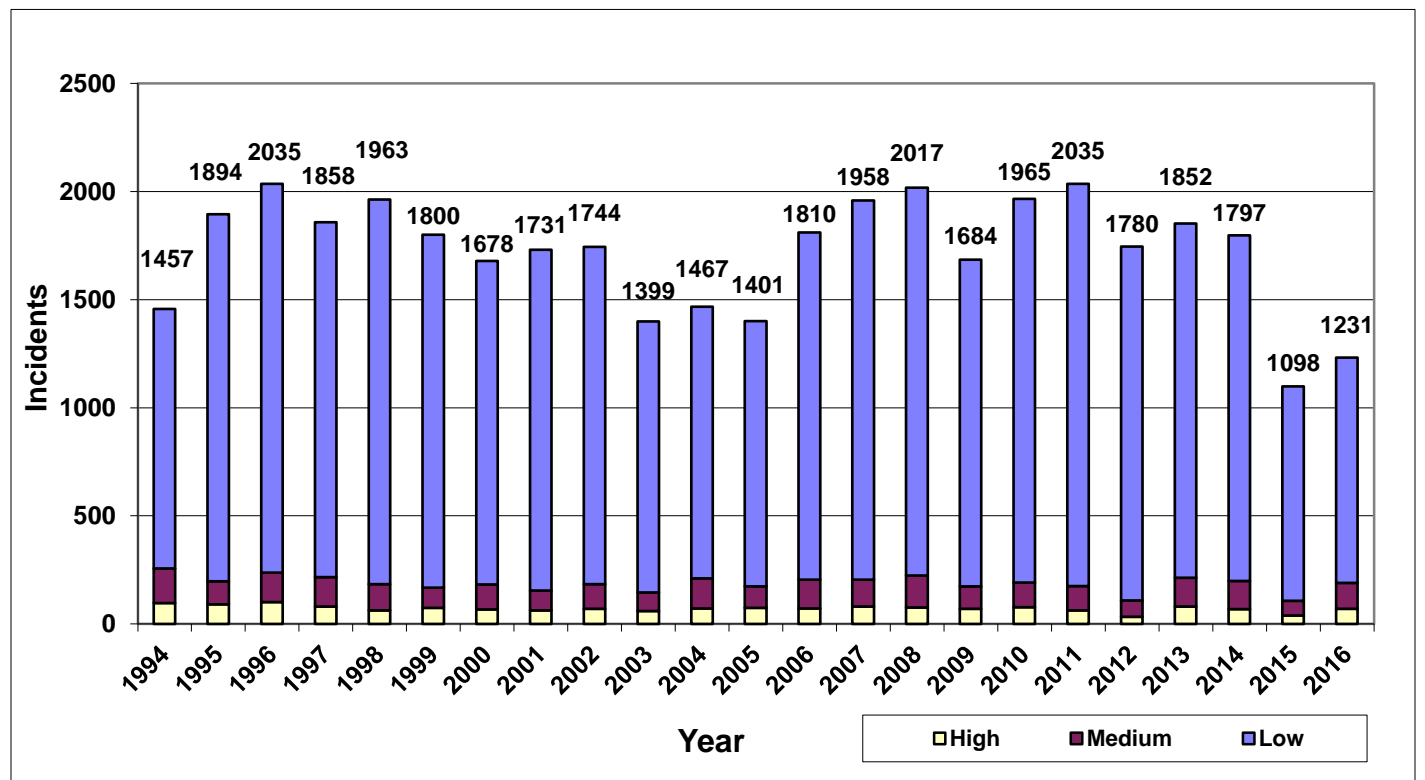
A vessel incident is defined as one involving a towing vessel or barge engaged in carrying freight. Incidents where ONLY a crew member death, personnel injury or operational oil spill occurred, without a precipitating or associated towing vessel or barge incident, are not included in this measure since they are included in other sections of this report.

Charts 7 and 8 show the number of towing vessel incidents reported and classified by the AWO-USCG Severity Scale. The Severity Scale was developed by the National Quality Steering Committee. The Severity Scale and description is provided at the end of this report. Towing vessel incidents include ALL reportable marine casualties that involve a towing vessel or barge involved in freight movements. Tugs and barges involved in the construction, dredging and other service industries are not included. Each incident is counted only once, regardless of the number of involved vessels or recorded events.

In 2016, there were 1,231 towing vessel incidents, of which 84% were classified as low severity incidents. Medium and high severity incidents represented 10% and 6%, respectively. There was a 12.8% increase in investigated incidents from 2015 to 2016. The number of medium and high severity incidents remains fairly consistent over the years.

Our review of the data verifies that some previously reported low severity incidents are no longer required to be reported due to Marine Casualty Reporting Navigation and Inspection Circular (NVIC) 15-01. This NVIC clarified and increased the requirements for low severity incident reporting. As a result, there are fewer lower severity incidents allowing investigators to spend more time and give greater scrutiny to medium and high severity incidents. Also, changes incorporated into the new MISLE 5.0 system allowed for a more detailed and accurate classification of data. As investigators are becoming more familiar with the robust documentation features in the new MISLE System, casualty reporting will be more refined.

The Coast Guard will continue to monitor its data to determine if other issues are affecting reporting.



Other maritime industry segments have experienced a decrease in the number of reported incidents. Between 2014 and 2016 there has been a 42% reduction in all Reportable Marine Casualties reported to the Coast Guard. Over the same period, the towing vessel industry experienced a 32% reduction in reported incidents.

From 2015 to 2016 the total number of reported towing vessel incidents and the combined number of medium and high severity incidents increased equally by 12%.

The annual safety report prepared in 2016 showed a spike in medium and high severity incidents in 2015. After a closer inspection it was discovered that a 2014 MISLE system upgrade created a more detailed vessel description introducing industrial, construction and dredging vessel incidents into the data set. These industry segments had not been included previously because those vessels are not the focus of the Coast Guard-AWO Safety Partnership. Also, it was discovered that personnel casualty and pollution incidents not involving a towing vessel or barge incident were included in the data set. The errors for 2015 were corrected in this report.

Chart 8 - Medium and High Severity Towing Vessel Incidents

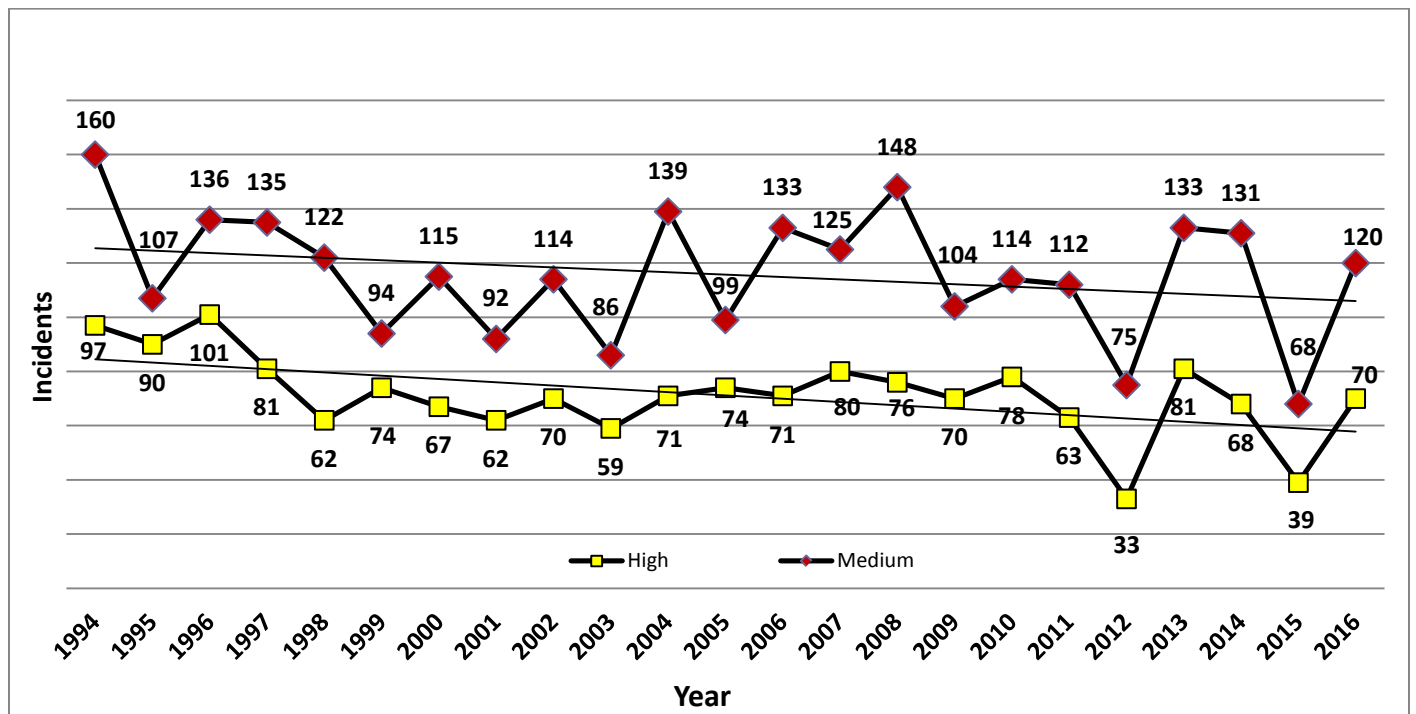
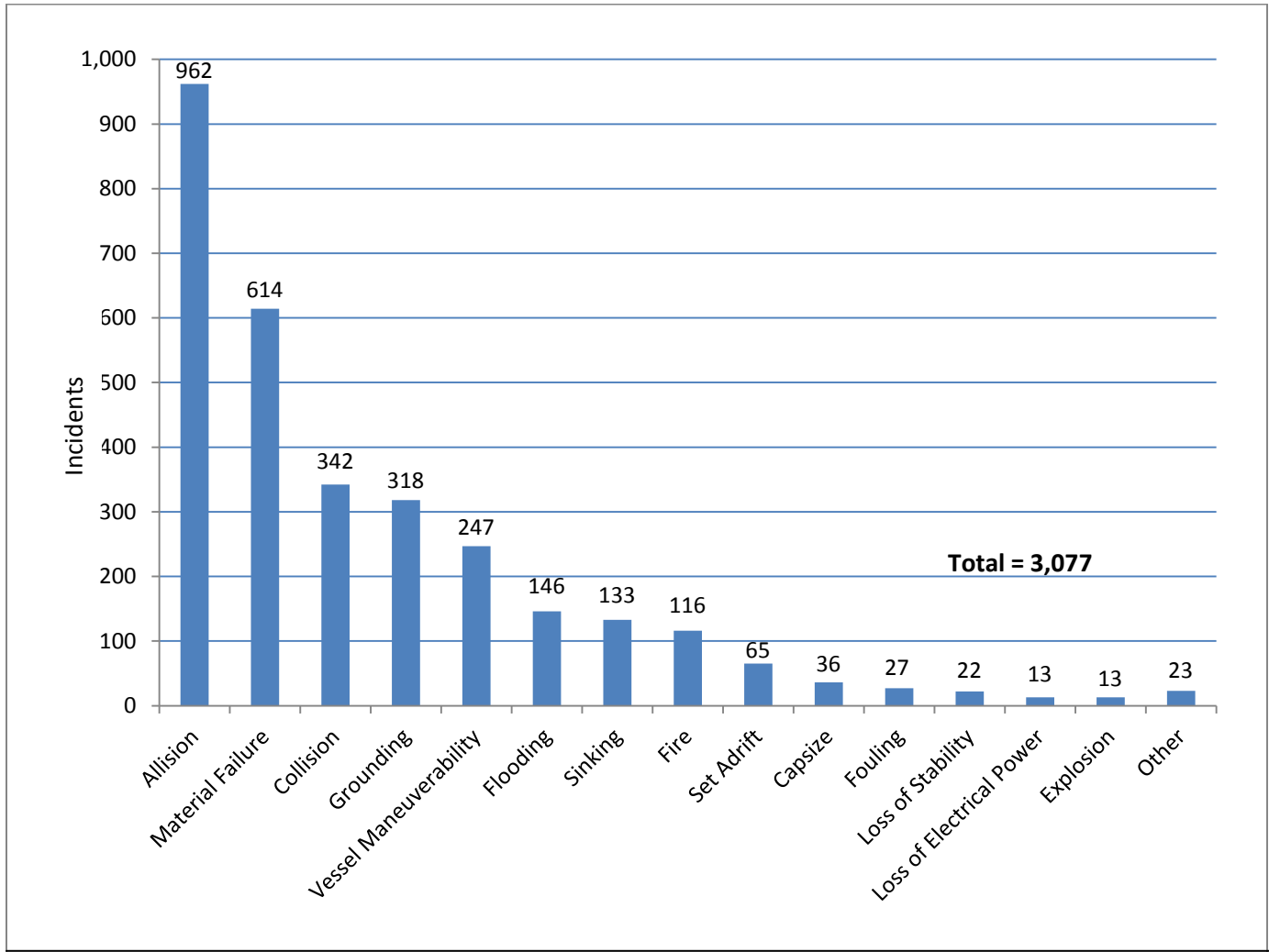


Chart 9 shows the number of medium and high severity incidents by the initial event⁵ for 2001 to 2016 excluding incidents involving only a personnel casualty or pollution. The 16 year trend shows an allision initiated 31% of all medium & high severity incidents. Also, an initial event recorded as a collision, allision or grounding accounted for 53% (1,622 of 3,077) and material failure accounted for 20% of all towing vessel medium and high severity incidents.

Chart 9 - Medium & High Severity T/V Incidents by Initial Event (CY2001 to 2016)



⁵ The Coast Guard’s MISLE system is designed to document marine casualties as a series of events, with corresponding locations, involved vessels and other details. The “Initial Event” is the description of the event as recorded by the Coast Guard in the incident notification.

Crew Member Injuries

In 2005 the Coast Guard began documenting injury severity with each incident investigation. A description of the injury severity scale is provided at the end of this report.

In 2016 there were 100 injuries involving 98 incidents, down from 109 injuries in 2015, involving a crew member where “vessel class” or “vessel service” was recorded as “towing vessel” or “barge”. The breakdown of injuries by severity is shown in Table 3. There were two incidents where two crew members were injured in each incident (one shackle/mooring line failure, one allision resulting in falls). These two incidents were the only multiple injury incidents involving crew members.

Table 3 - Number of Injuries by Severity for CY 2015/2016

Injury Severity	2015	2016	% Change
5 - Critical	4	0	-3.7%
4 - Severe	2	5	+3.2%
3 - Serious	23	20	-1.1%
2 - Moderate	46	39	-3.2%
1 - Minor	34	36	+4.8%
Total	109	100	-8.3%

In 2016 there were no injuries that met the critical severity threshold. Also, between 2015 and 2016 there was a small decrease (-1.8%) in the “most significant” category, combining serious, severe and critical in nature.

Chart 10 summarizes crew member injuries by severity for calendar years 2006 – 2016. From 2006 to 2016, 72% of injuries were either minor or moderate in severity. This compares similarly to 2016 data, where 75% of injuries fall into these two categories. There has been a slight increase in minor and moderate injuries over the past 2 years.

Chart 10 - Injuries by Severity (CY 2006-2016)

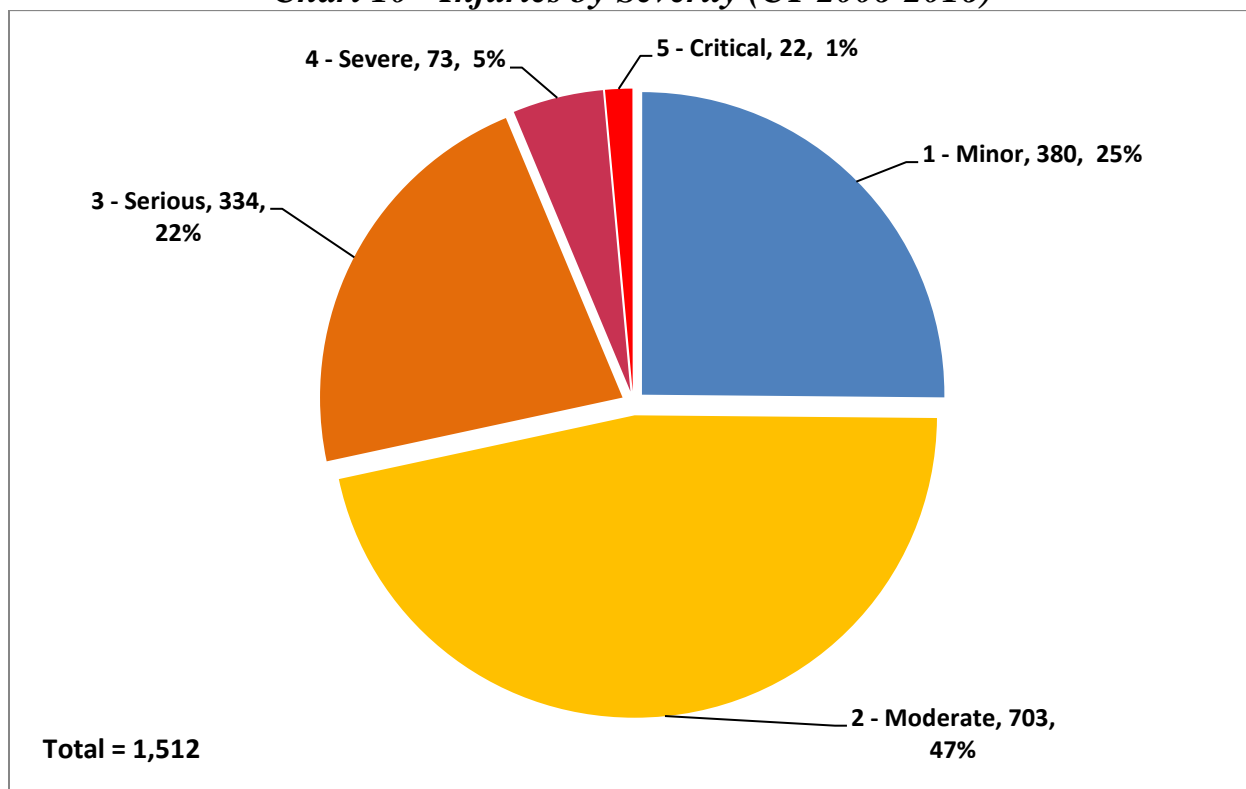
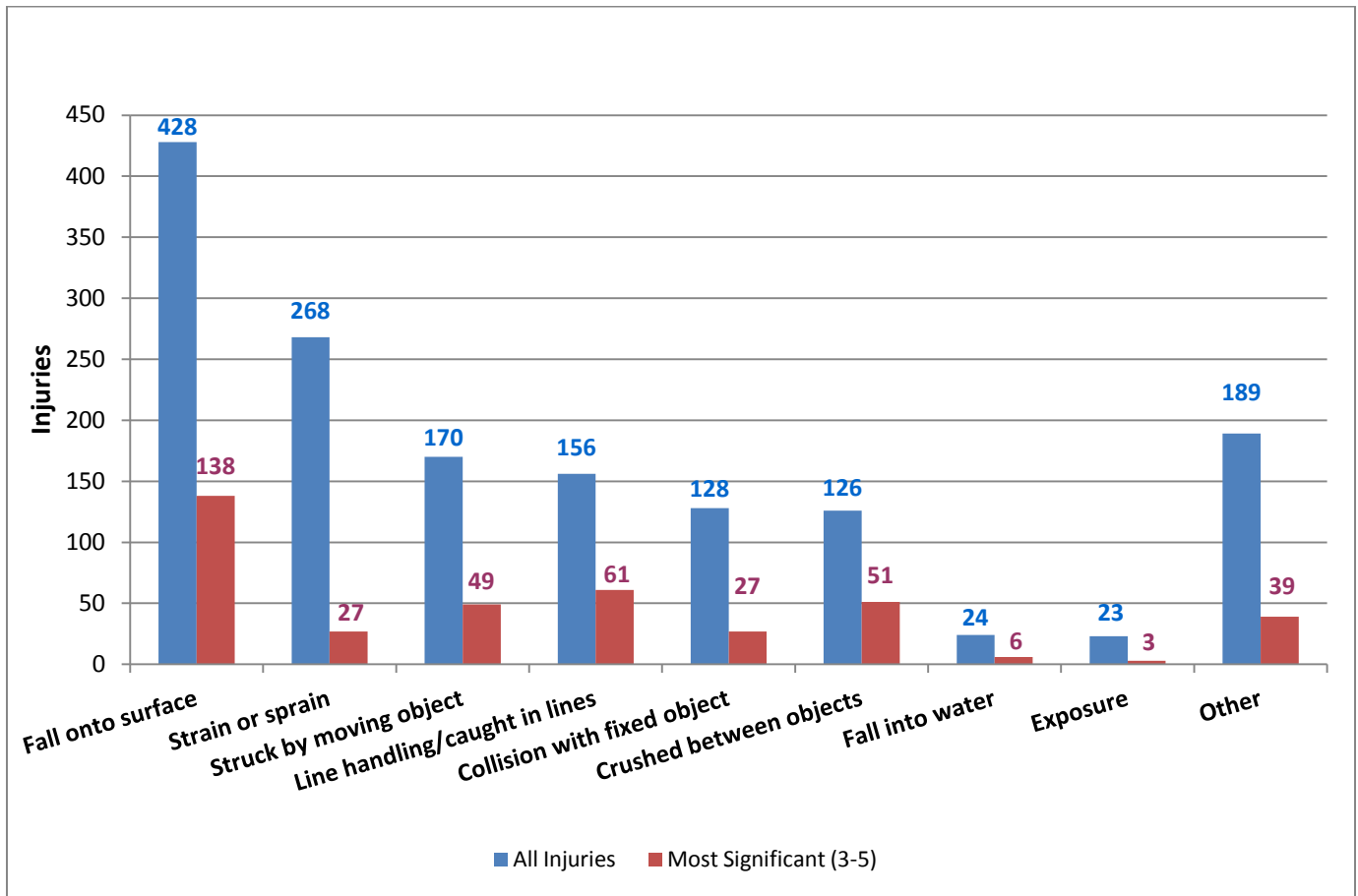


Chart 11 shows the number of injuries by accident type associated with injuries in all severity categories and those involving the most significant injuries (combining the three highest severity categories: 3- Serious, 4- Severe, and 5- Critical). A Fall onto Surface is the leading accident type in the data sets, 28% in all injuries and 34% in the most significant injury category.

Accident types most associated with injuries in the most significant category in frequency order are:

- Fall onto surface,
- Line handling/caught in lines,
- Crushed between objects, and
- Struck by moving object.

Chart 11 - Injuries by Accident Type (CY2006 – 2016)⁶



⁶ In 2005 the Coast Guard adopted the injury severity metrics (1 -5) developed by the Department of Transportation into the MISLE system. Commencing in 2006, the severity scale was used to breakout and analyze the most significant (3, 4 and 5) injuries.

USCG-AWO Severity Classes for Towing Vessel Casualties

Incident Severity	Description
Low	Damage: \$0 - \$50,000 or not reported No injuries or deaths Pollution: 0 - 10 gallons of oil spilled CG Casualty Class: None/Routine
Medium	Damage: \$50,001-\$250,000 No injuries or deaths Pollution: 11-1000 gallons of oil spilled CG Casualty Class: "Significant"
High	Damage: \$250,001 or more ANY injuries or deaths Pollution: 1,001 or more gallons spilled Casualty Class "Serious" or "Major"

USCG Injury Severity Scale

Injury Severity Scale Description and Examples
✕

Minor The injury is minor or superficial. No professional medical treatment was required.

Examples: Minor/superficial scrapes (abrasions); minor bruises; minor cuts; digit sprain; first degree burn; minor head trauma with headache or dizziness; minor sprain/strain

Moderate The injury exceeds the minor level, but did not result in broken bones (other than fingers, toes or nose), loss of limbs, severe hemorrhaging, muscle, nerve, tendon or internal organ damage. Professional medical treatment may have been required. If so, the person was not hospitalized for more than 48 hours within 5 days of the injury.

Examples: Broken fingers, toes or nose; amputated fingers or toes; degloving of fingers or toes; dislocated joint; severe sprain/strain; second/third degree burns covering 10% or less of body (if face included, move up one category); herniated disc

Serious The injury exceeds the moderate level and requires significant medical/surgical management. The person was not hospitalized for more than 48 hours within 5 days of the injury.

Examples: Broken bones (other than fingers, toes, or nose); partial loss of limb (amputation below elbow/knee); degloving of entire hand/arm or foot/leg; second/third degree burns covering 20-30% of body (if face included, move up one category); bruised organs

Severe The injury exceeds the moderate level and requires significant medical/surgical management. The person was hospitalized for more than 48 hours within 5 days of the injury and, if in intensive care, was in for less than 48 hours.

Examples: Internal hemorrhage; punctured organs; severed blood vessels; second/third degree burns covering 30-40% of body (if face included, move up one category); loss of entire limb (amputation of whole arm/leg)

Critical The injury exceeds the moderate level and requires significant medical/surgical management. The person was hospitalized and in intensive care for more than 48 hours within 5 days of the injury.

Examples: Spinal cord injury; extensive second- or third-degree burns; concussion with severe neurological signs; severe crushing injury; internal hemorrhage; second/third degree burns covering 40% or more of body; severe/multiple organ damage

Close