



American  
Waterways  
Operators



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

National Quality Steering Committee Meeting  
July 31, 2018

## Established Safety Metrics

For 18 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 established 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 freight carrying towing industry data and measures for calendar years 1994 to 2017. It also includes summary statistics on crew member injuries, which the National Quality Steering Committee began tracking in 2006, for calendar years 2006 to 2017.

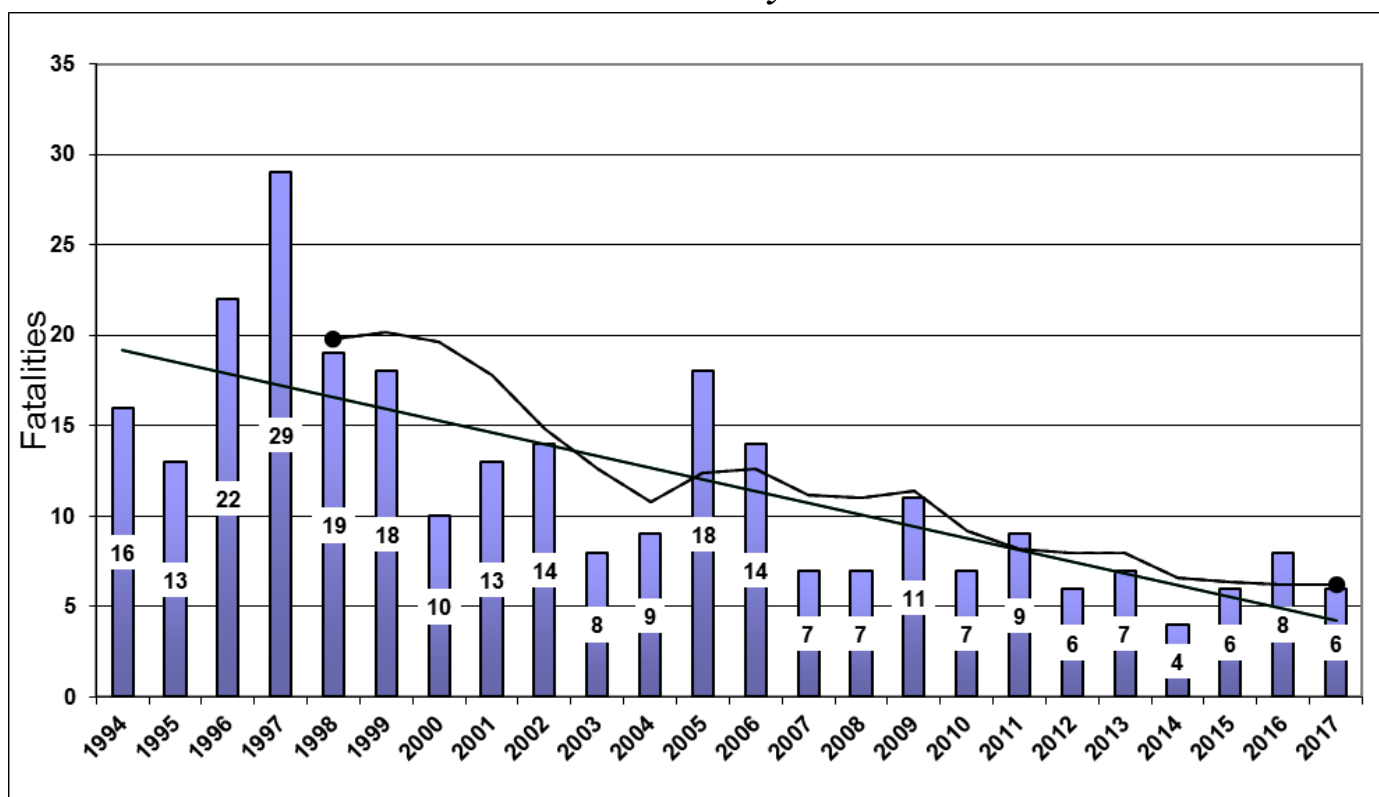
## Crew Fatalities

In 2017, there were six operational towing vessel crew fatalities<sup>1</sup>. While thirteen deaths were reported to the Coast Guard aboard freight carrying towing vessels in 2017, only six were directly related to towing vessel operations. The other seven deaths were due to existing medical conditions (6) and an accidental overdose (1).

Of the six crew fatalities, two vessel casualties accounted for two deaths each, and the other two deaths occurred in separate incidents. The first case resulting in two deaths involved a towing vessel engaged in fleeting operations that quickly sank. After salvage operations and subsequent investigation, which is still ongoing, it was determined that both crewmen drowned after the vessel sank. The other case, involving two deaths, was the explosion and fire aboard a barge at an Aransas Pass anchorage, offshore Corpus Christi, TX. Even though these two cases are still open and all facts and analysis have not been completed, the fatality and oil spill data are included in this report as they are known facts. In the other separate incidents, the two crew deaths were the result of falling into the water. One fell while working on a fleeting area barge, and the other fell or jumped into the water while attempting to escape 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 2017.

*Chart 1 - Crew Fatalities by Calendar Year*



<sup>1</sup> The 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 or 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 member fatalities is attributed to falls overboard (79 of 164, 48%). The second largest number is attributed to asphyxiation (27 of 164, 16%).

**Chart 2 - Crew Fatalities by Accident Type (CY 2000 – 2017)**

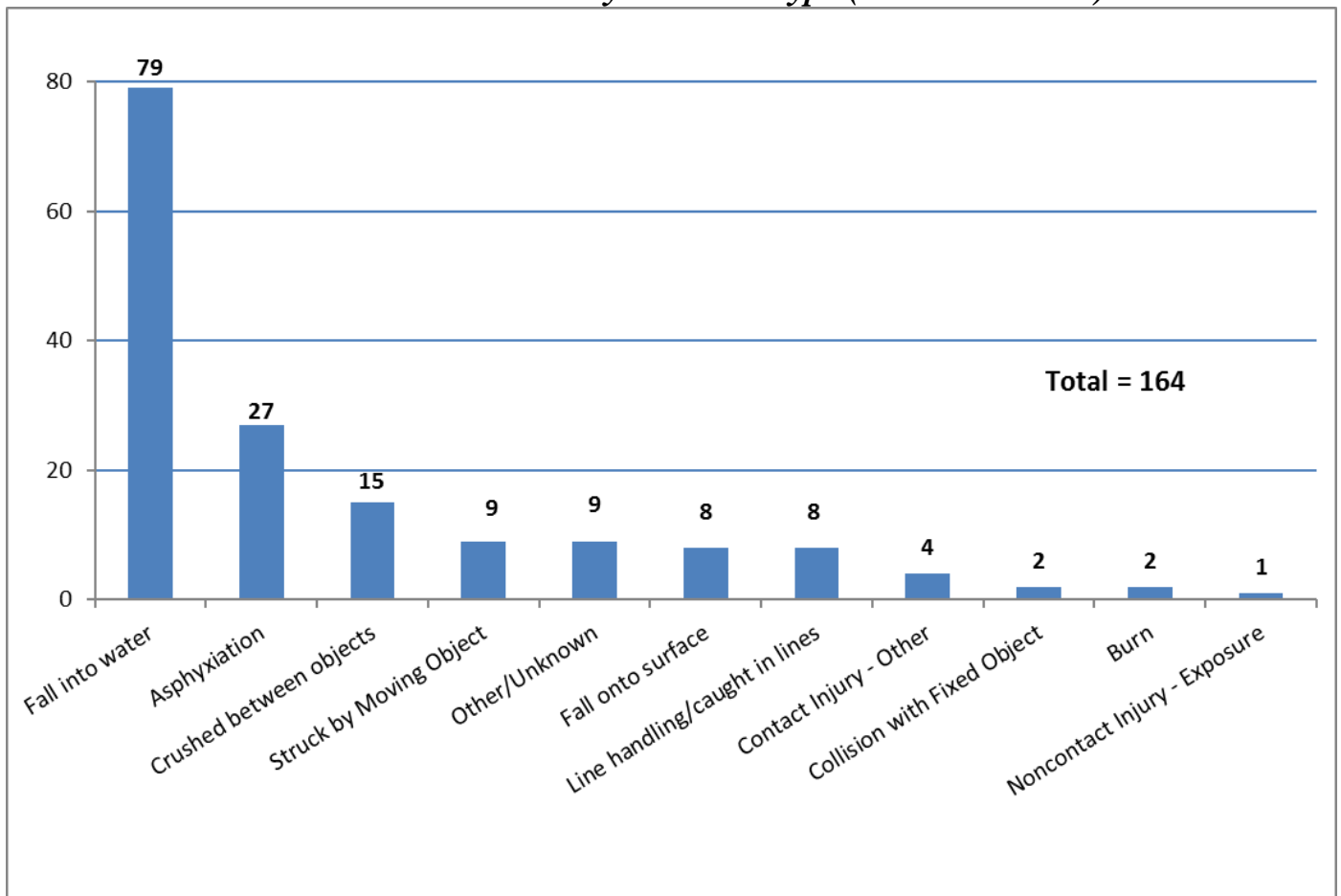
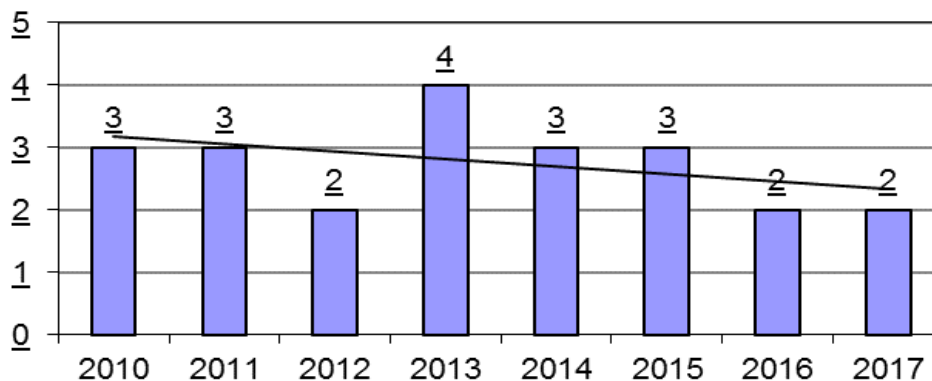


Chart 3 shows the number of fatalities resulting from falls overboard for calendar years 2010 to 2017. While the annual number of fatalities for all accident types has steadily decreased, the number of fatalities due to falls overboard has recently shown a slight decrease as well.

**Chart 3 - Crew Fatalities due to Falls Overboard**



## Crew Fatality Rate

The 2017 projected crew fatality rate per 100,000 FTE<sup>2</sup> is six, and there were actually six operational crew fatalities. Chart 4 shows the actual crew fatality rate from 1994 to 2016 and the projected rate for 2017. 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 USACE data available lags one calendar year behind the Coast Guard data. Therefore, the 2016 USACE data is used with the 2017 crew fatality number to project the 2017 crew fatality rate. Since the calculated towing industry FTE is very close to 100,000, the 2017 projected fatality rate is equal to the actual fatality number.

**Chart 4 - Crew Fatality Rate per 100,000 FTE<sup>2</sup>**

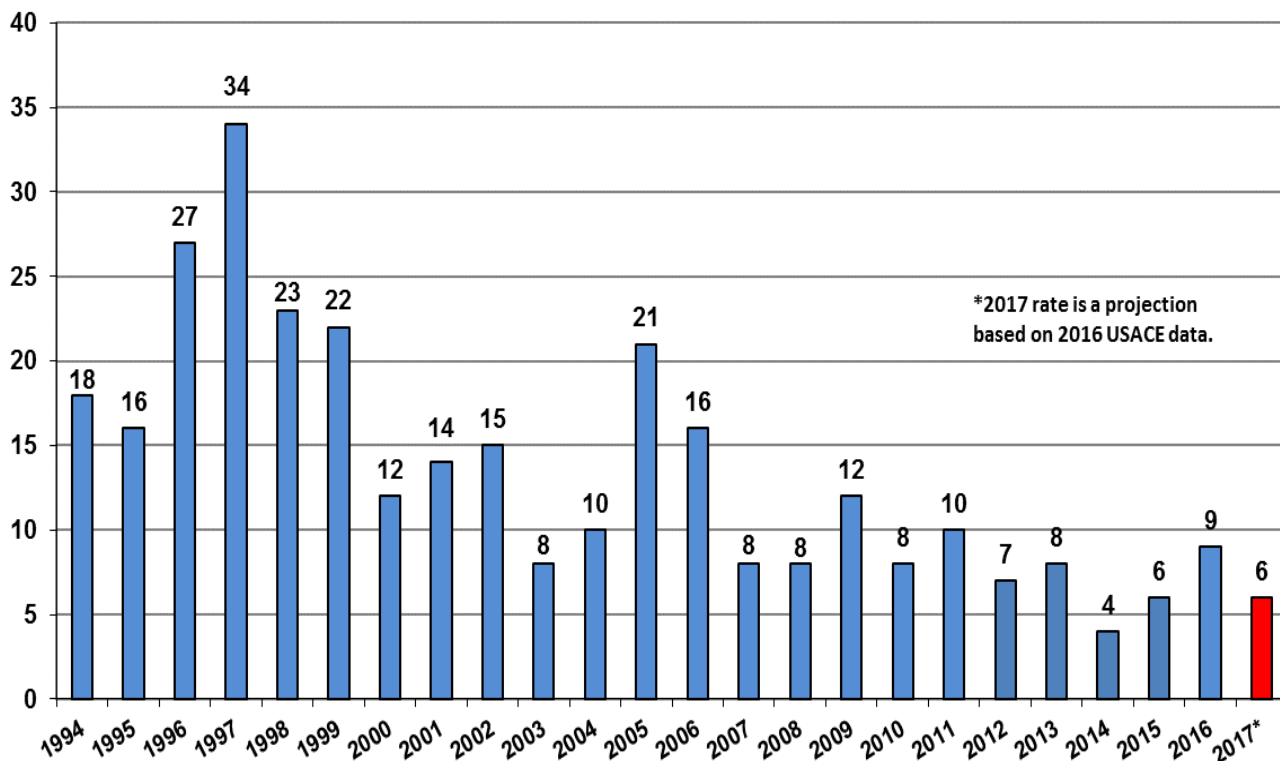


Table 1 shows the fatality rates per 100,000 FTE calculated by the Bureau of Labor Statistics (BLS) for all workers from 2012 to 2016<sup>3</sup>. Additionally, Table 1 shows the fatality rates for the transportation sector and towing industry. For 2016, the towing industry fatality rate is 8.6, which is approximately half 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	2016
Bureau of Labor Statistic (BLS), All Fatal Work Injuries	3.4	3.3	3.4	3.4	3.6
BLS, Transportation Sector Fatal Work Injuries	14.6	14.4	15.4	14.7	15.4
Towing Industry, Crew Member Operational Fatal Work Injuries	6.7	7.8	4.4	6.7	8.6

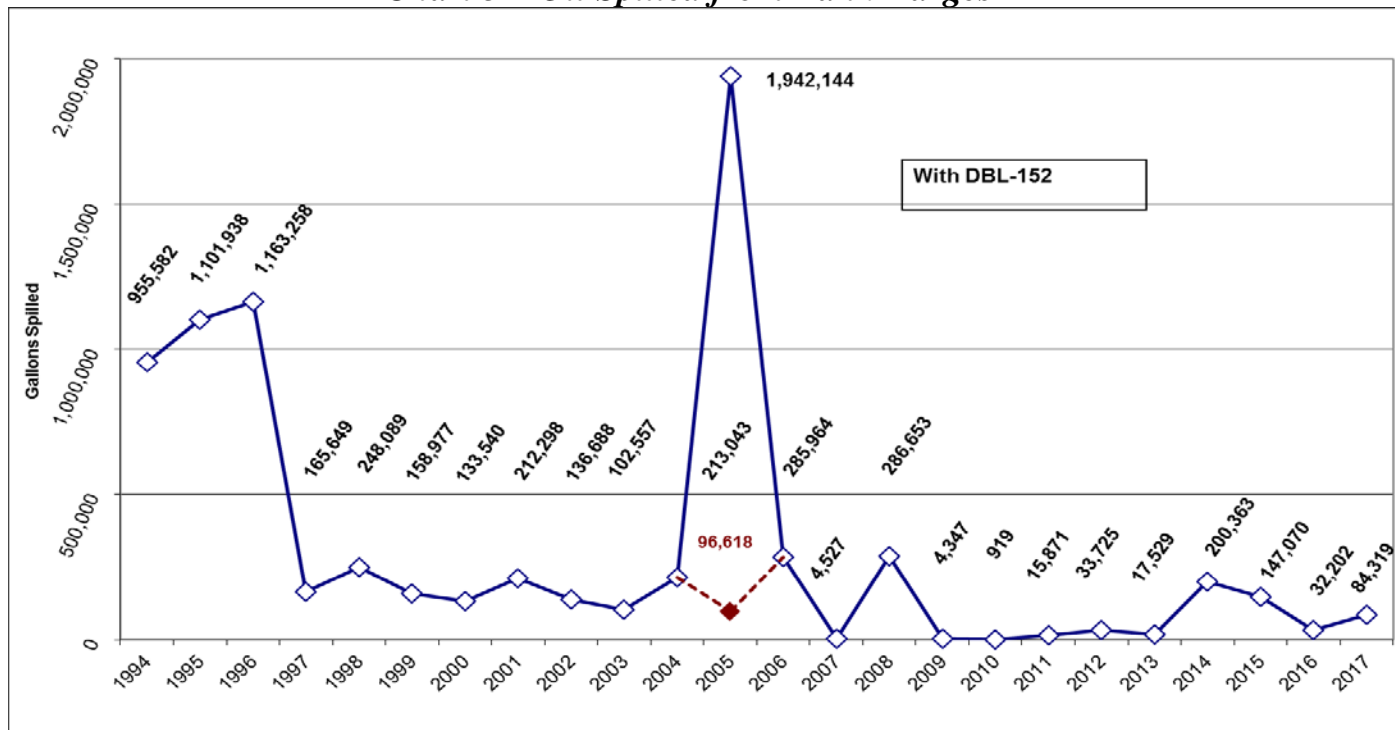
<sup>2</sup> An FTE or Full Time Employee is the equivalent of one person working a 40-hour work week, for 50 weeks of the year.

<sup>3</sup> <https://www.bls.gov/iif/oshwc/cfoi/cfch0015.pdf>

## Oil Spill Volumes

According to Coast Guard records, 84,319 gallons of oil were spilled as a result of 49 tank barge pollution incidents in 2017. Chart 5 shows the total gallon quantity of oil spilled from tank barges for calendar years 1994 to 2017.

**Chart 5 – Oil Spilled from Tank Barges**



The largest spill was the result of an explosion and fire aboard a barge at an Aransas Pass anchorage, offshore Corpus Christi, TX. An explosion and fire occurred while retrieving the barge’s anchor. The initial explosion released 79,506 gallons, and a post-accident lighterage operation spilled an additional 420 gallons, for a total of 79,926 gallons of spilled Bonito Crude. This incident accounted for 95% of the total oil spilled in 2017.

The second largest spill was the result of a loss of situational awareness aboard a tank barge during cargo transfer operations to a refining facility. While making deck rounds, the tankerman noticed an accumulation of liquid in a stern containment. Unaware it was oil, he opened the scuppers, allowing 1,800 gallons of Utica Crude to spill into the Big Sandy River near Catlettsburg, KY. This spill accounted for 2% the total volume spilled in 2017.

In the third largest spill of 2017, approximately 1,500 gallons of heavy fuel oil (HFO) was spilled into Chickasaw Creek, a Mobile River tributary, due to the overfilling of a tank barge. The tankerman misaligned valves to load HFO into one tank, instead of three, resulting in the tank quickly overfilling. This spill accounted for 2% of the 2017 total. These three spills accounted for 99% of the total volume of oil spilled from tank barges in 2017.

**Table 2 – Oil Spills by Spill Size, CY2017**

Gallons of Oil Spilled	Number of Oil Spill Events (spill amounts in gallons)
More than 1,000	3 (80k, 1.8k, and 1.5k) → <b>99%</b>
101 to 1,000	2 (500 and 200)
1 to 100	37
Less than 1	7
	<b>1%</b>

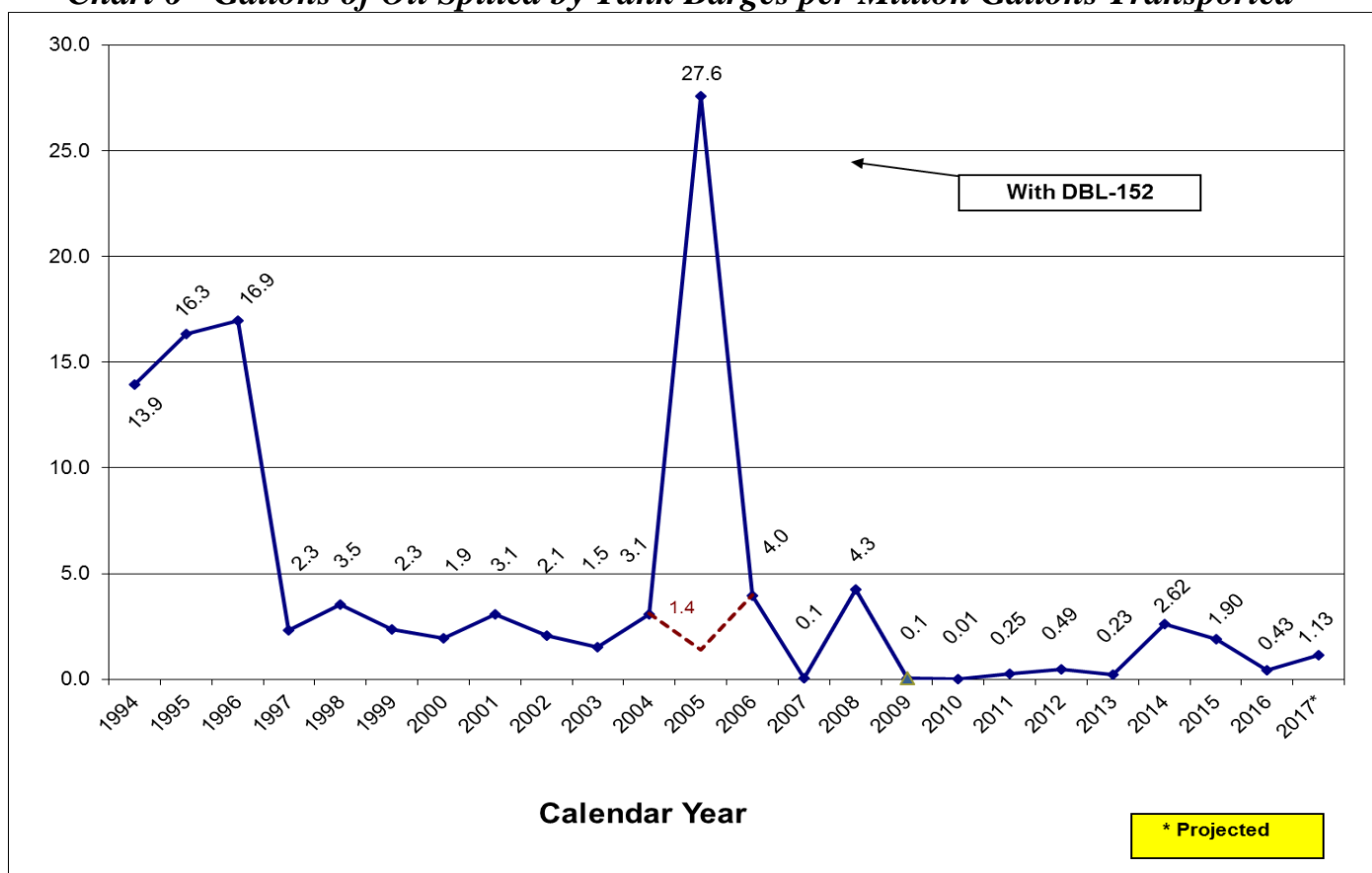
## Oil Spill Rate

The projected oil spill rate for 2017 is approximately 1.13 gallons of oil spilled for every million gallons transported, or one gallon of oil spilled for every 885,000 gallons transported.

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*,<sup>4</sup> Part 5, Table 2-3. The latest publication available of this USACE data is for calendar year 2016, and therefore, the 2017 spill rate is a projection using 2016 oil movement data.

In 2016, the USACE reported 272.8 million short tons, or approximately 74.8 billion gallons, of oil was transported by barge on U.S. waterways. That amount represents 80.8% of all oil and petroleum products carried on domestic waterways. In 2016, the amount of oil transported by barge on domestic waterways decreased by 10.2 million short tons or 2.8 billion gallons, a 3.6% decrease from 2015.

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



The decreases in the amount of oil transported by barge and the amount spilled between 2015 and 2016 reflect an oil spill rate reduction from 1.9 to 0.43 gallons over that time period. If 2016 oil transportation volumes remain the same for 2017, the 2017 spill rate will be 1.13 gallons per million gallons transported. The 2017 rate will be finalized when next year's USACE report becomes available.

Overall, the oil spill rate continues to be relatively low considering the overall volumes transported, and that oil volumes transported by barge have increased 17.7% over the past six years (2011-2016).

<sup>4</sup> <https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/1387>

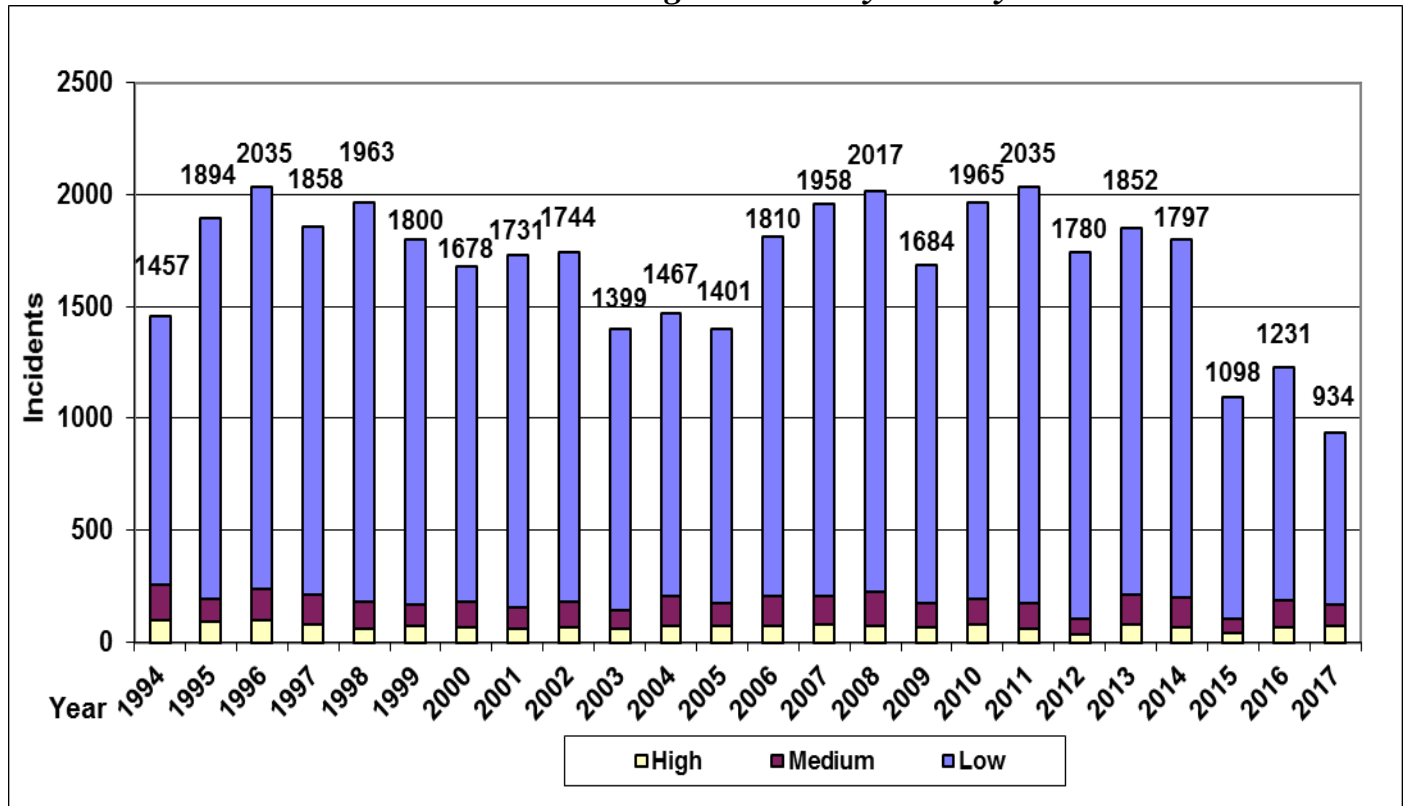
## Severity of Vessel Incidents

A vessel incident is defined as a casualty involving a towing vessel or barge engaged in carrying freight. Incidents where ONLY a crew member death, injury, or operational tank barge 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 to assist in the classification of these incidents. The Severity Scale and a description of each category 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 industrial services are not included. Each incident is counted only once, regardless of the number of involved vessels or recorded events.

In 2017, there were 934 towing vessel incidents, of which 82% were classified as low severity incidents. Medium and high severity incidents represented 10% and 8%, respectively. There was a 24% decrease in investigated towing vessel incidents from 2016 to 2017.

**Chart 7 - All Towing Incidents by Severity**

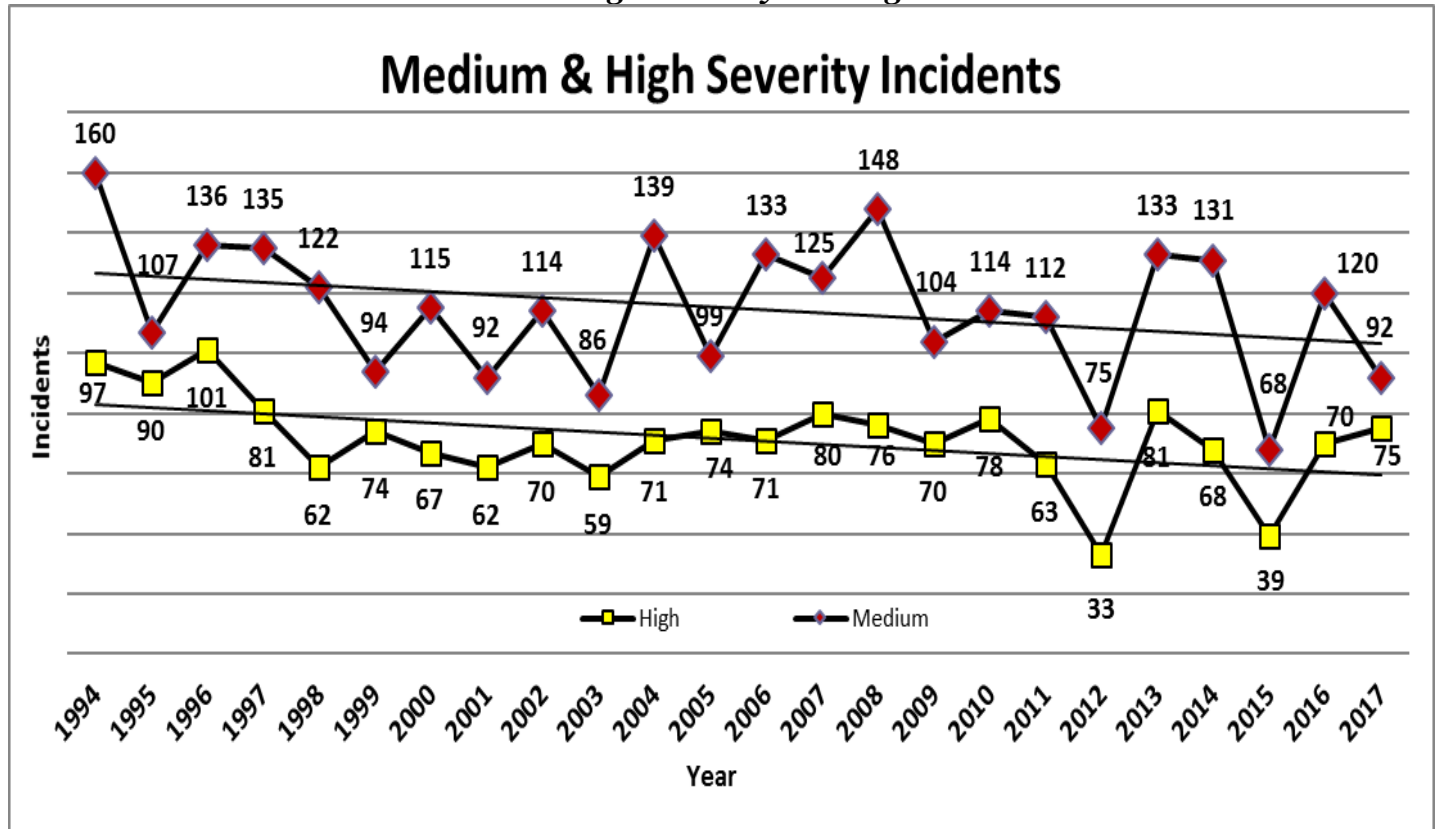


Our review continues to reflect fewer low severity incidents being reported due to Marine Casualty Reporting Navigation and Inspection Circular (NVIC) 01-15, which clarified reporting requirements. This is allowing investigators to concentrate more effort and greater scrutiny on medium and high severity incidents. Also, changes incorporated into the new version of the Coast Guard’s data collection system, the Marine Information for Safety and Law Enforcement (MISLE), allows for a more detailed and accurate classification of data. Investigators are becoming more familiar with the new documentation features in the new MISLE system and vessel casualty reporting is more robust and refined.

Other maritime industry segments have experienced a similar decrease in the number of reported incidents as a result of NVIC 01-15. From 2014 through 2017, there has been a 45% reduction in ALL Reportable Marine Casualties reported to the Coast Guard. Over those same years, the towing vessel industry has experienced a 48% reduction in reported incidents.

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

**Chart 8 - Medium and High Severity Towing Vessel Incidents**

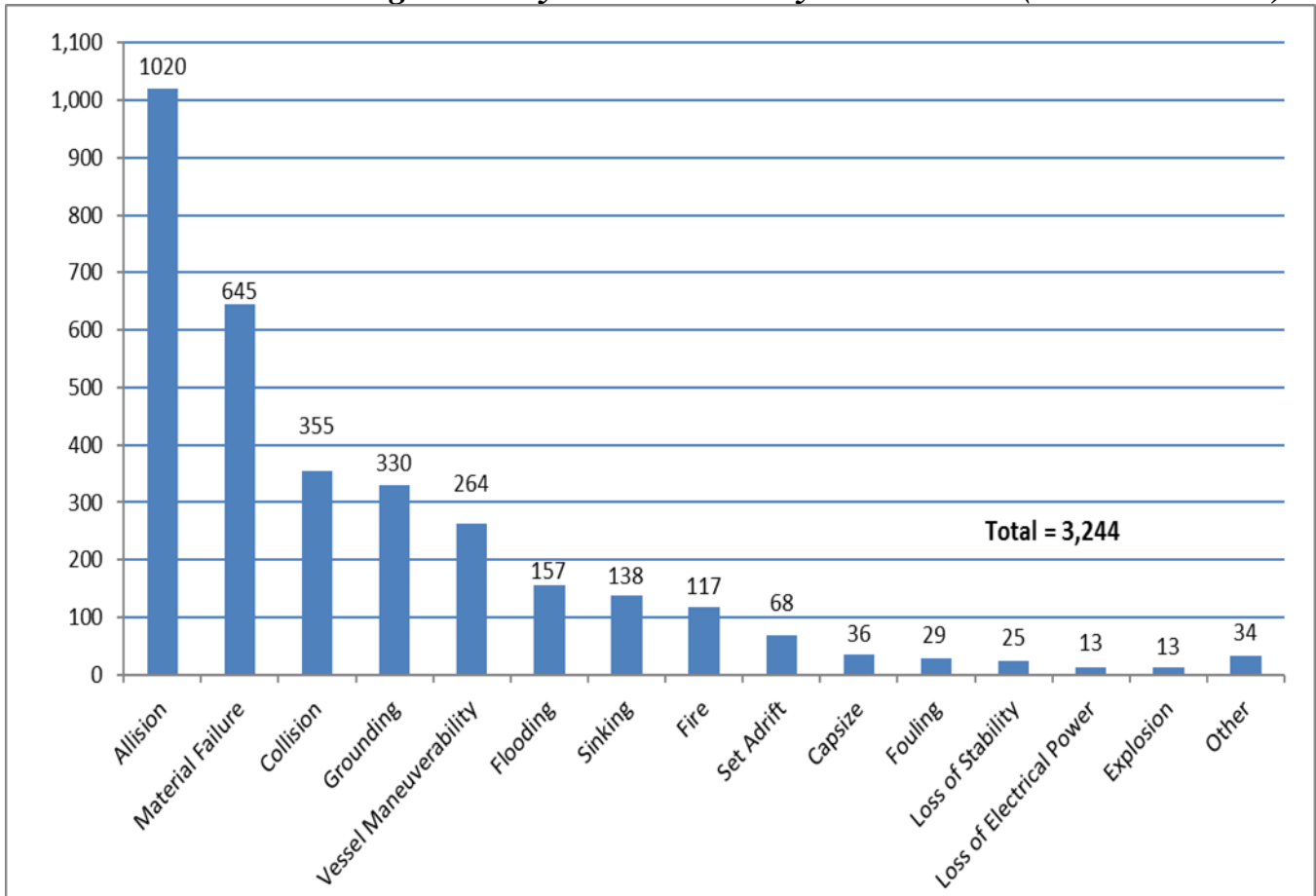


In 2017, there were 92 medium and 75 high severity Reportable Marine Casualty incidents. From 2016 to 2017, the combined number of medium and high severity incidents decreased by 12% (from 190 to 167). Although the high severity incidents increased by 7% and medium severity incidents decreased by 23%, the 24-year trend line slope for both metrics continues in a decreasing direction.



Chart 9 shows the number of medium and high severity incidents by the initial event<sup>5</sup> for 2001 through 2017, excluding incidents involving only a personnel casualty or pollution. In 2017, 167 medium and high severity incidents were added, and the 17-year trend continues to show an allision initiated 31% of all incidents. The top four categories of towing vessel medium and high severity incidents are collisions, allisions, groundings, or material failures. Collisions, allisions, or groundings accounted for 53% (1,705 of 3,244) and material failures accounted for 20% of towing vessel medium and high severity incidents.

**Chart 9 - Medium & High Severity T/V Incidents by Initial Event (CY2001 to 2017)**



<sup>5</sup> 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 2017, there were 89 injuries, as a result of 89 incidents involving a crew member where vessel “class” or “service” was recorded as “towing vessel” or “barge”. There were no multiple injury incidents. Injuries were down 11% from 2016. The breakdown of injuries by severity is shown in Table 3.

**Table 3 - Number of Injuries by Severity for CY 2016/2017**

Injury Severity	2016	2017	% Change
5 - Critical	0	0	0.0%
4 - Severe	5	2	-60.0%
3 - Serious	20	15	-25.0%
2 - Moderate	39	35	-10.2%
1 - Minor	36	37	+2.8%
<b>Total</b>	<b>100</b>	<b>89</b>	<b>-11.0%</b>

In 2017, as in 2016, there were no injuries that met the critical severity threshold. Also, between 2016 and 2017, there was a 20% decrease in the “most significant” injury category, combining serious, severe, and critical in nature, another significant decrease.

Chart 10 summarizes crew member injuries by severity over the past 11 calendar years. From 2006 to 2017, the overall percentage of minor and moderate severity injuries remains at 72%. This category’s good news stories are that no injury in 2017 reached the critical severity level, and that the share of moderate severity injuries has decreased by 1% relative to the share of minor severity injuries. All other severity categories remained at the same percentage level between 2016 and 2017.

**Chart 10 - Injuries by Severity (CY 2006-2017)**

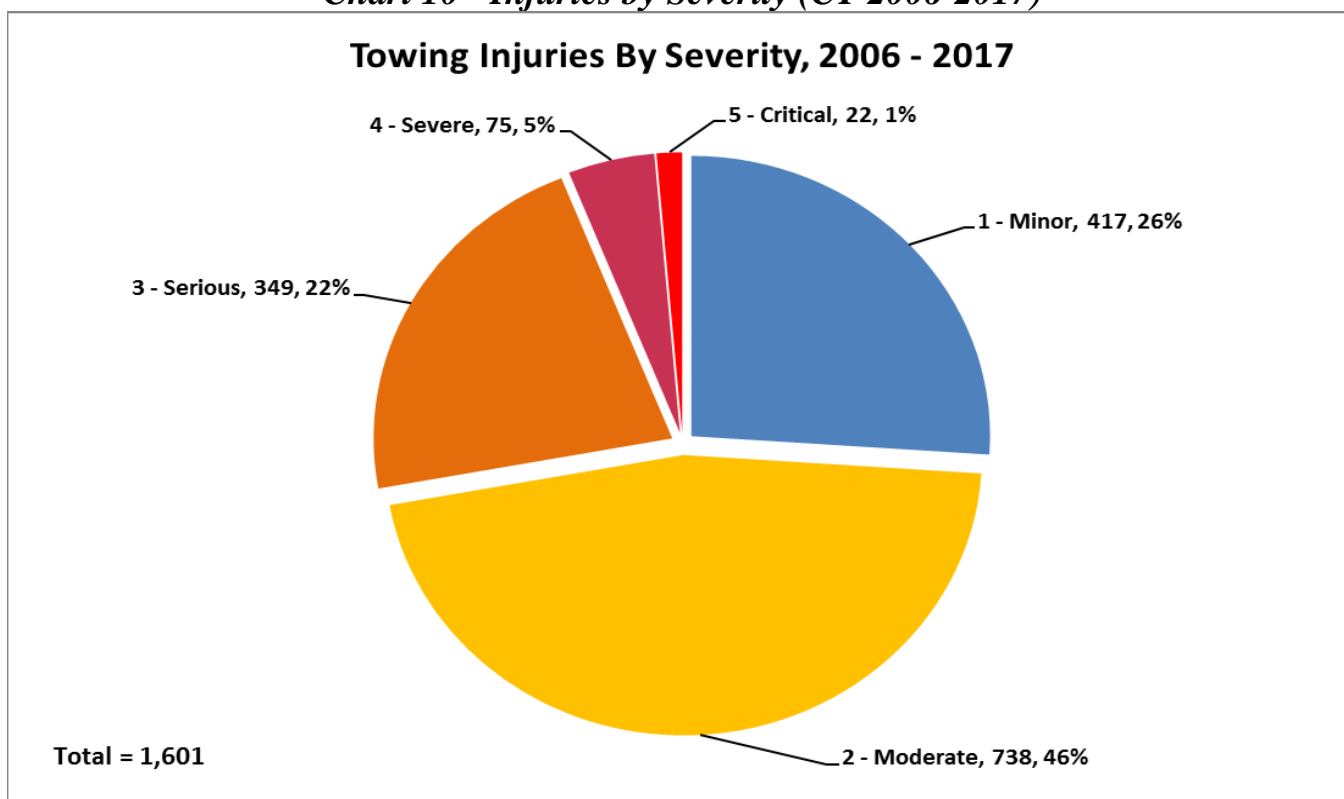
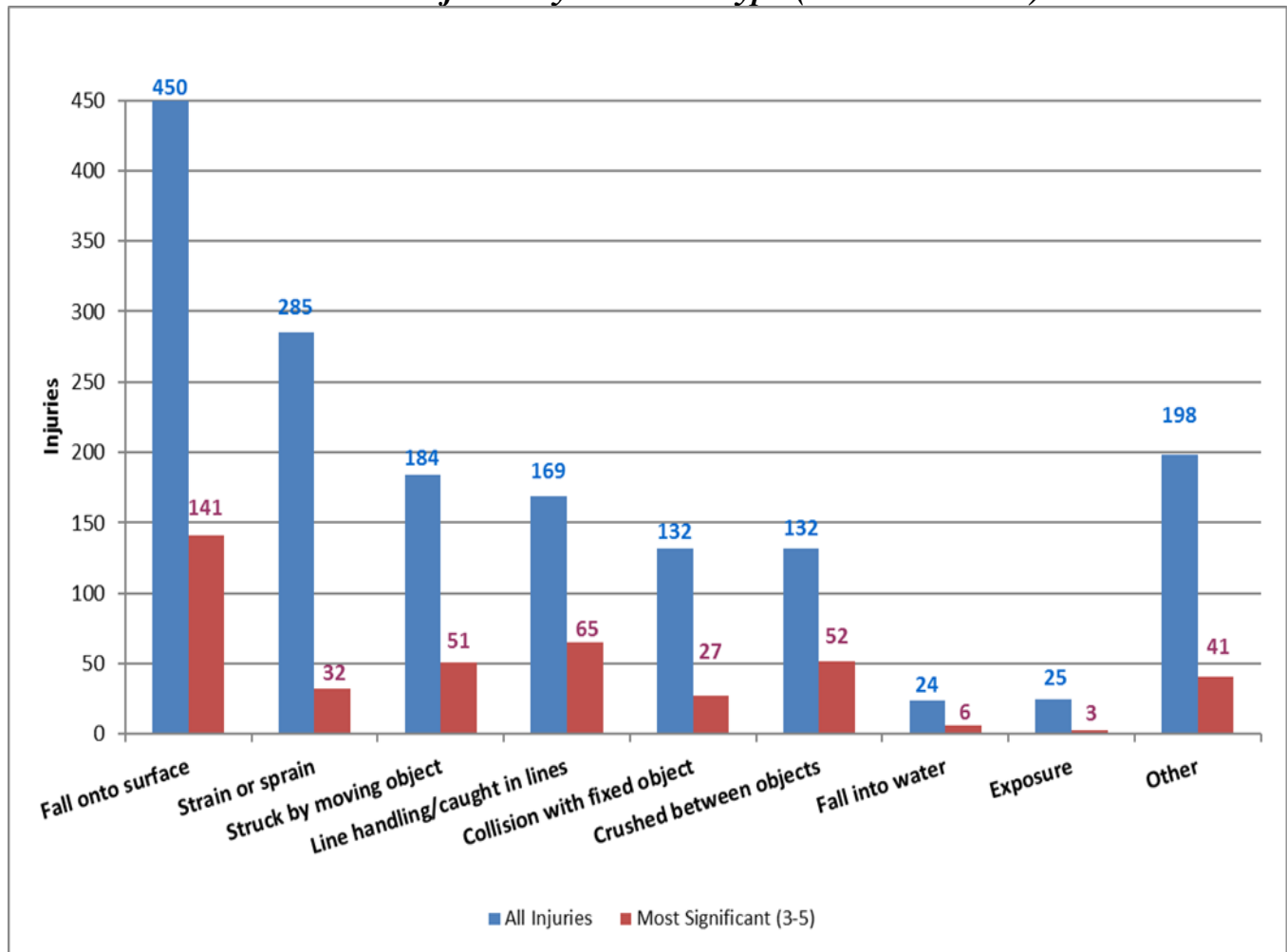


Chart 11 shows the number of injuries by accident type associated with injuries in all severity categories and those involving most significant injuries (combining the three highest severity categories: 3 - Serious, 4 - Severe, and 5 - Critical). A “Fall onto Surface” is the leading accident type in 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 – 2017)<sup>6</sup>**



<sup>6</sup> 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 ‘most significant’ (3, 4, and 5) injuries.

## USCG-AWO Severity Classes for Towing Vessel Casualties

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