



American  
Waterways  
Operators



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

National Quality Steering Committee Meeting

August 3, 2016

## Established Safety Metrics

For 16 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 to be 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 vessel casualties (overall or by incident severity).

This report contains towing industry data and measures for calendar years 1994 to 2015.

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 2015.

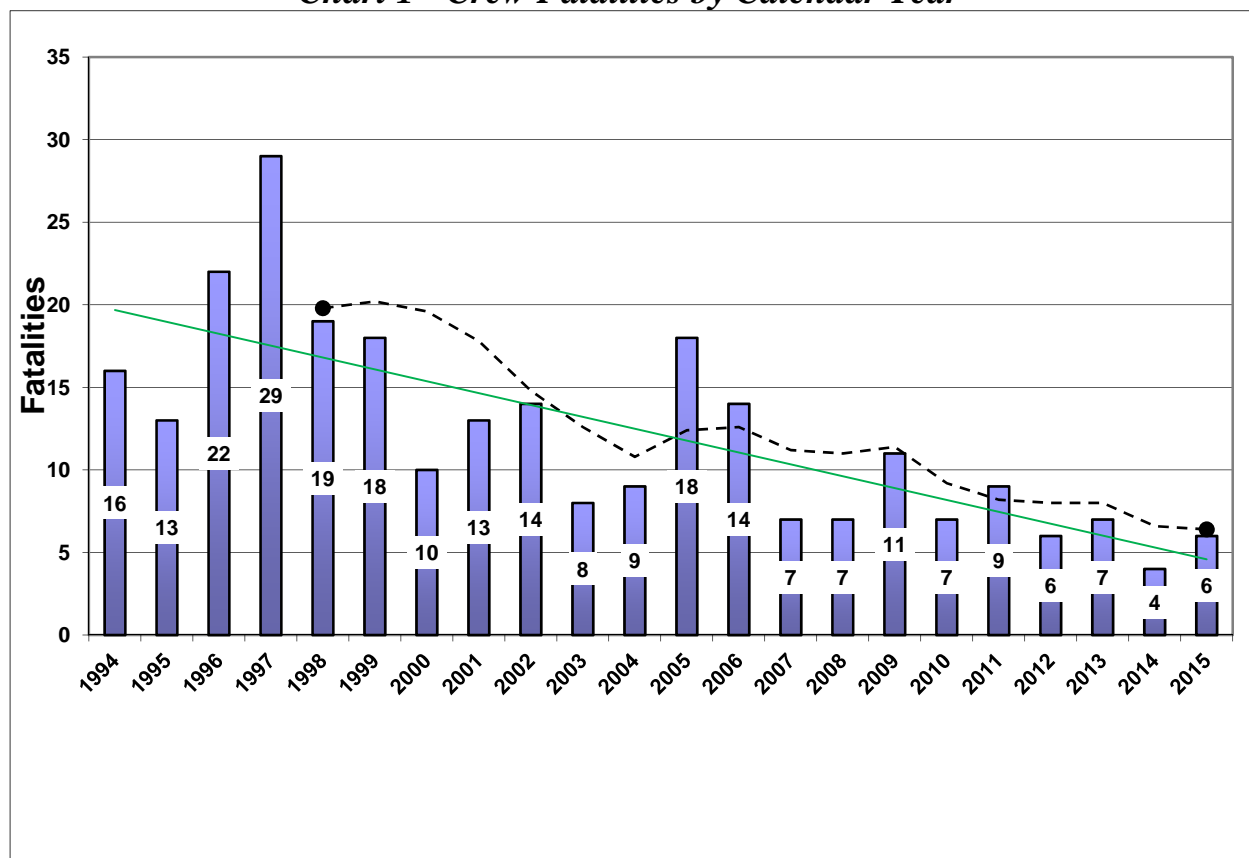
## Crew Fatalities

In 2015, there were six crew fatalities<sup>1</sup>. There were a total of ten towing vessel deaths reported to the Coast Guard, but only six were directly related to towing vessel operations. The other four deaths were attributed to existing medical conditions (2) and natural causes (2).

Of the six crew fatalities, three were the result of crew members falling into the water. One crew member fell from a barge while securing into a fleeting area, one crew member fell while embarking a towing vessel, and one crew member fell while disembarking a towing vessel. There were two casualties where the towing vessel capsized and resulted in a single fatality in each instance. There was one casualty where the crew abandoned the vessel before it sank, and the master died from exposure.

Chart 1 shows the annual fatality count, the linear trend line and the 5-year moving average for calendar years 1994 through 2015.

*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. Missing crew members are also recorded as crew fatalities. 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 (75 of 150, 50%). The next largest group of fatalities is attributed to asphyxiation (23 of 150, 15%).

**Chart 2 - Crew Fatalities by Accident Type (CY 2000 – 2015)**

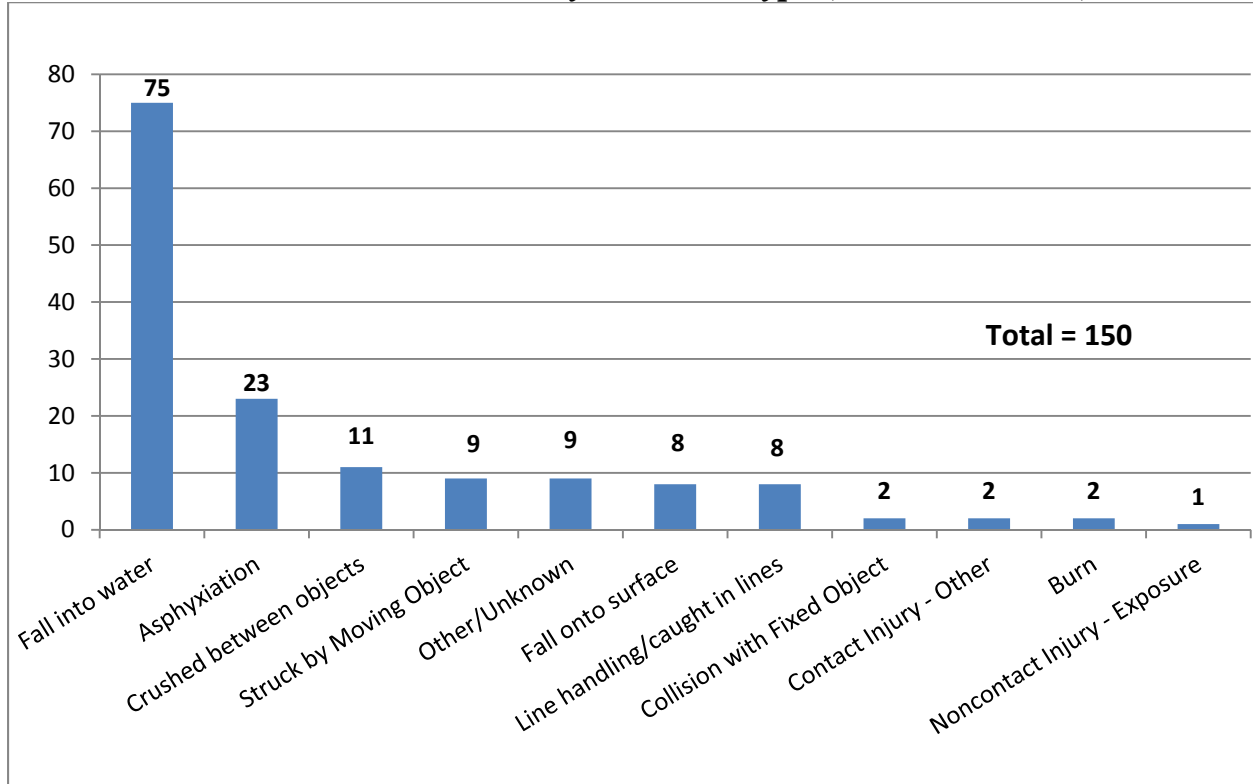
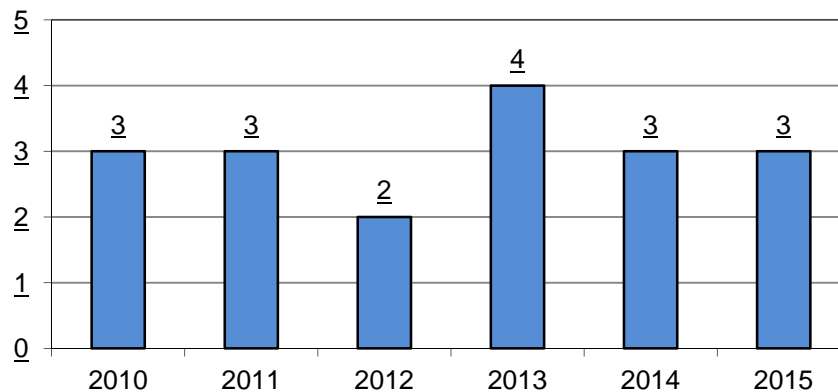


Chart 3 shows the number of fatalities resulting from falls overboard for calendar years 2010 to 2015. While the annual number of fatalities for all accident types has steadily decreased, the number of fatalities due to falls overboard has remained constant.

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



## Crew Fatality Rate

The crew fatality rate for 2014 was four, and the projected crew fatality rate for 2015 is seven. Chart 4 shows the crew fatality rate from 1994 to 2015. 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 (ACOE). The most recent data available is for calendar year 2014. As such, the depicted 2015 rate is a projection based on the 2014 ACOE data.

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

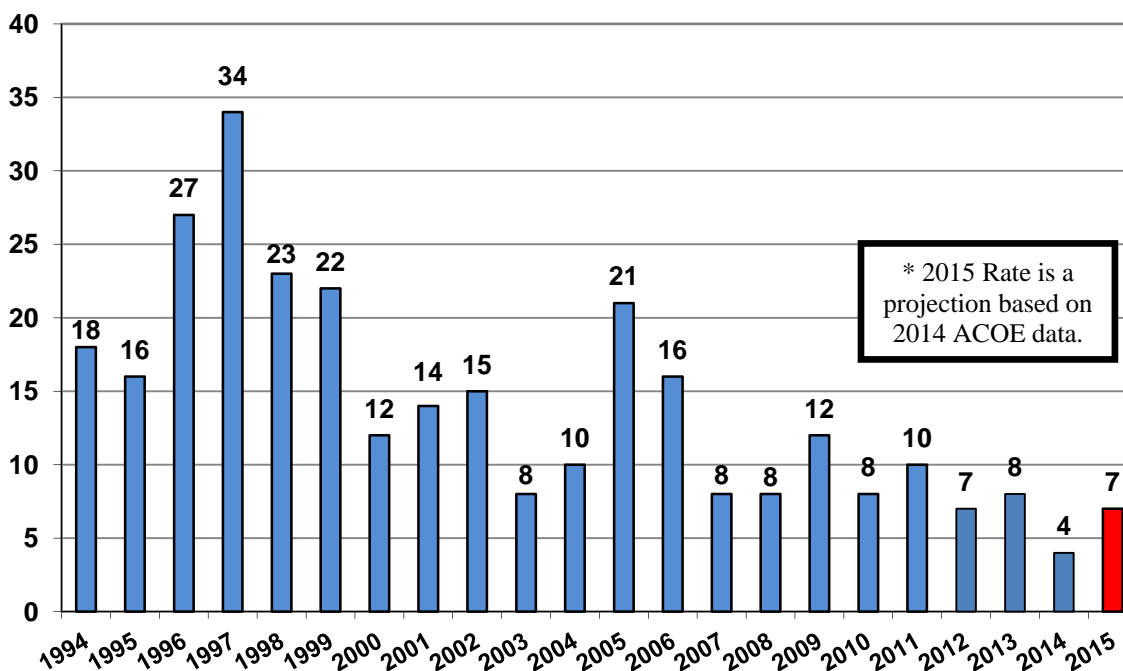


Table 1 shows the fatality rate calculated by the Bureau of Labor Statistics (BLS) for all workers from 2012 to 2014<sup>3</sup>. In addition, Table 1 shows the fatality rate for the transportation sector and towing industry. In comparison, the towing industry fatality rate has been below the BLS fatality rate for the Transportation Sector over the same period.

**Table 1 – Comparison of Worker Fatality Rates**

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

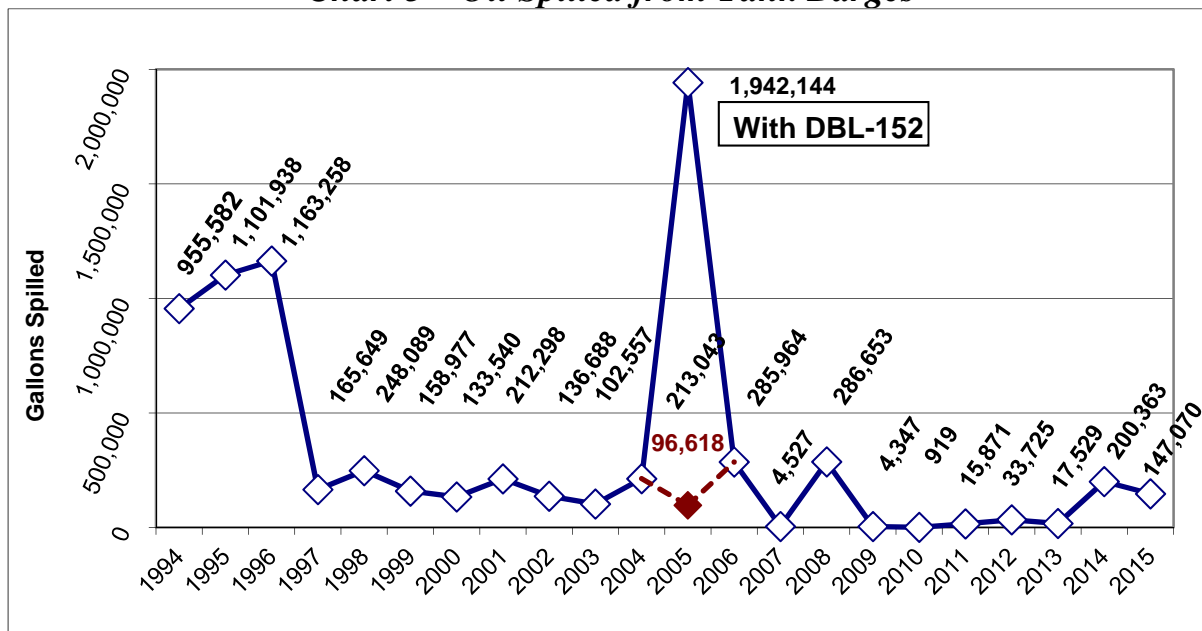
<sup>2</sup> An FTE or Full Time Employee is the equivalent of one person working a 40-hour work week, for 50 weeks of the year.

<sup>3</sup> <http://www.bls.gov/iif/oshwc/foi/cfch0013.pdf>

## Oil Spill Volumes

According to Coast Guard records, 147,070 gallons of oil was spilled as a result of 68 tank barge pollution incidents in 2015. Chart 5 shows the total gallon quantity of oil spilled from tank barges for calendar years 1994 to 2015.

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



The largest spill of 120,000 gallons was the result of a collision involving the UTV PB SHAH, UTV DEWEY R and their accompanying barges, which took place on the Lower Mississippi River in the vicinity of Columbus, Kentucky. The collision resulted in the release of nearly all the slurry oil from one tank on the barge APEX 3508. This spill accounted for 82% of the total volume spilled in 2015.

The second largest spill of 22,000 gallons was the result of the UTV PECOS, which was pushing two gasoline barges, colliding with the moored tank barge KIRBY 28020. The collision resulted in the release of naphtha into the Houston Ship Channel. This spill counted for 15% of the total volume spilled in 2015.

These two spills accounted for 97% of the total volume of oil spilled from tank barges in 2015. Table 2 shows the number of oil spills by spill size.

**Table 2 – Oil Spills by Spill Size, CY2015**

Gallons of Oil Spilled	Number of Oil Spill Events (spill amounts in gallons)
More than 1000	3 (120k, 22k & 3k)
101 to 1000	6 (420, 418, 300, 300, 132, & 126)
1 to 100	52
Less than 1	7

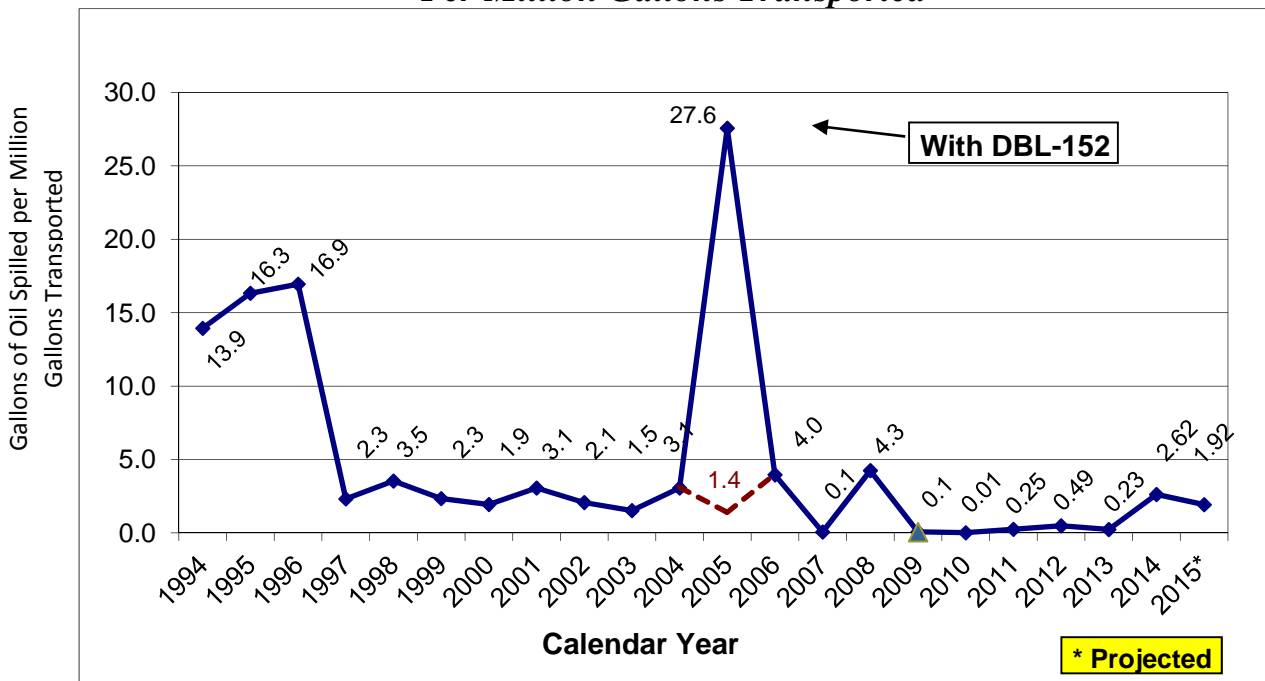
## Oil Spill Rate

The oil spill rate for 2015 is projected to be approximately one gallon of oil spilled per 521,000 gallons transported, or 1.92 gallons of oil spilled per million gallons transported. Chart 6 shows the oil spill rate from 1994 to 2015.

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 (ACOE) publication “*Waterborne Commerce of the United States*,” Part 5, Table 2-3. The latest version of the publication is for calendar year 2014. As such, the 2015 spill rate is a projection based on 2014 data.

For 2014, the ACOE reported 278.9 million short tons, or approximately 76.4 billion gallons of oil transported by barge on U.S. waterways. That amount represents 82.4% of all oil carried on domestic waterways. In 2014, the amount of oil transported by barge increased by 5.8 million short tons or 1.6 billion gallons. This represents a 2.1% increase over 2013.

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



The 2.1% increase in the amount of oil transported by barge from 2013 to 2014 was accompanied by an increase in the oil spill rate from 0.23 to 2.62. If oil transportation volumes remain steady, then the projected rate of 1.92 for 2015 will be a slight improvement over 2014. Overall, the oil spill rate is relatively low when considering the volumes transported, and the fact that oil transportation volumes have steadily increased since 2010 (an 18% increase in volume over this period).

## Severity of Vessel Incidents

Charts 7 and 8 show all towing vessel incidents by the AWO-USCG severity scale. The Severity Scale was developed by National Quality Steering Committee, and a description of the scale is provided at the end of this report. Towing vessel incidents include all reportable marine casualties that involve a towing vessel or barge. Each incident is counted only once, regardless of the number of vessels involved or events recorded.

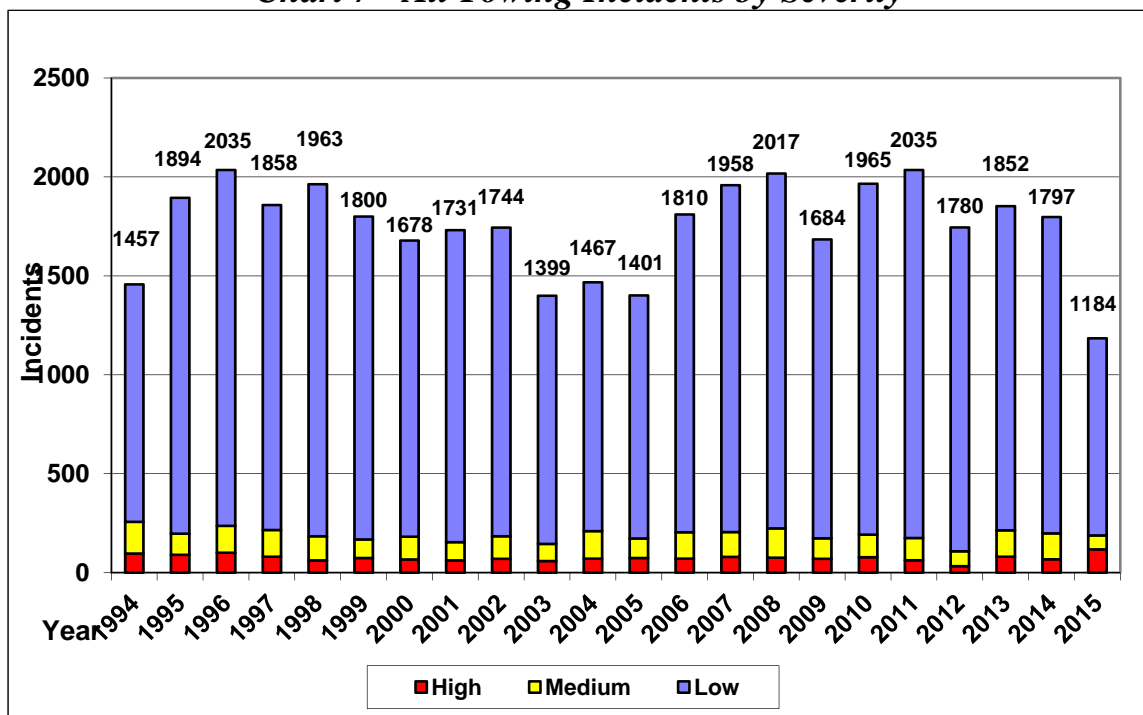
In 2015, 84% of towing vessel casualties were classified as low severity incidents. Medium and high severity incidents represented 6% and 10% of all incidents, respectively.

From 2014 to 2015, there was a significant decrease (34%) in all incidents recorded. Based on an initial review of the data, the following are possible reasons for the decrease in incidents:

- The release of the Marine Casualty Reporting Navigation and Inspection Circular (NVIC) 15-01, which clarified casualty reporting requirements for both industry and Investigating Officers. In particular, the NVIC clarified the reporting requirements for lower severity incidents.
- The change in MISLE database procedures and functionality which facilitates proper and accurate data entry. This change facilitates the proper documentation and classification of incidents in the Coast Guard database.

A decrease in number of incidents was also observed in other industry segments (i.e. passenger vessels), and the Coast Guard will continue to analyze the data to determine causes for this phenomenon.

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



While the total number of towing vessel incidents decreased by 34% from 2014 to 2015, the total number of medium and high severity incidents only decreased by 6.5%. Given that NVIC 15-01 specifically addressed the reporting requirements for lower severity incidents, it makes sense that the incident rates for medium and high severity incidents would not be as greatly affected by the NVIC.

This was the first year that the number of high severity incidents was larger than the number of medium severity incidents. Since all incidents resulting in any crew member injuries resulted in a High Severity designation, this number is greatly influenced by the number of crew member injuries. In 2015, there were 109 crew member injuries, which correlates with the 118 high severity incidents recorded.

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

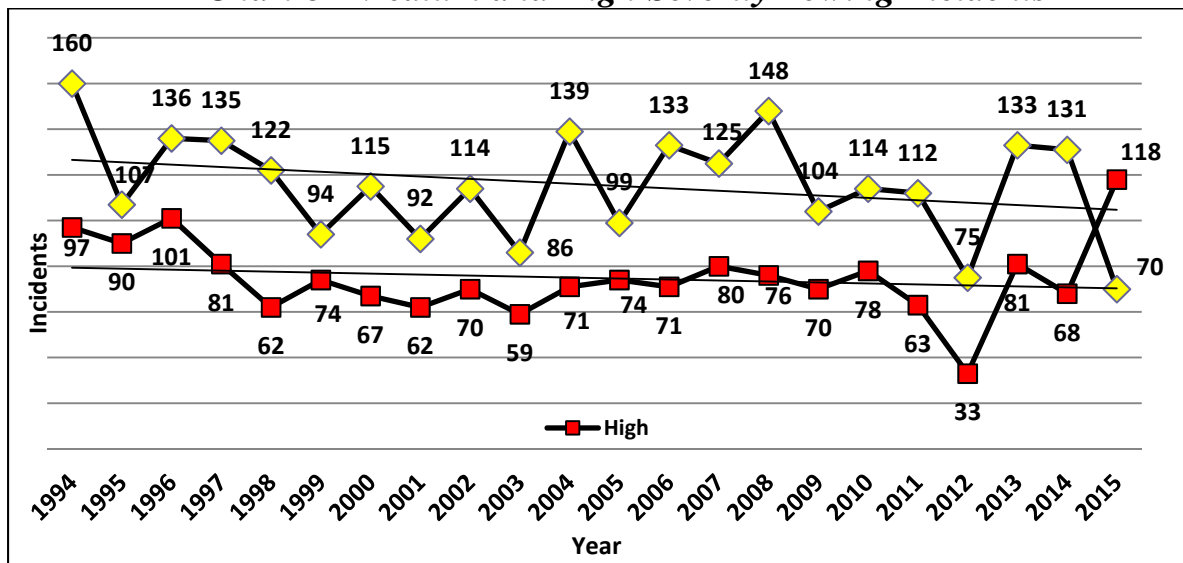
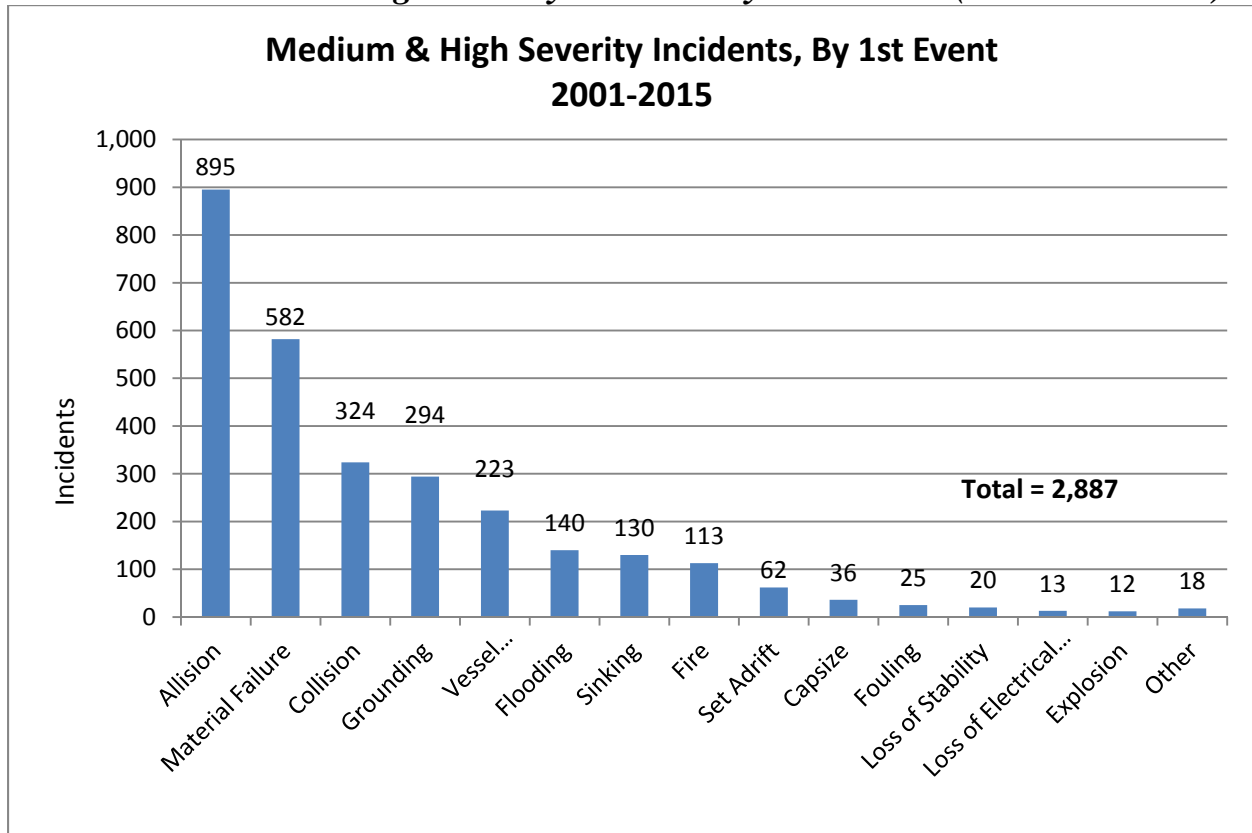




Chart 9 shows the medium and high severity incidents for 2001 to 2015 by the first event<sup>4</sup>. 31% of medium & high severity incidents began with an allision. Material failure was the first event in 20% of marine casualties.

**Chart 9 - Medium & High Severity Incidents by First Event (CY2001 to 2015)**



<sup>4</sup> The Coast Guard’s information system is designed to document marine casualties as a series of events, with corresponding locations, involved vessels and other details. The “First Event” or “Initiating Event” is the first event in a sequence of events leading up to the casualty.

## 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 2015 there were 109 injuries to crew members where the “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 only three incidents where more than one crew member was injured (one allision, two collisions). The most crew members injured in a single accident was four.

**Table 3 - Number of Injuries by Severity for CY 2015**

Injury Severity	Count
2 - Moderate	46
1 - Minor	34
3 - Serious	23
5 - Critical	4
4 - Severe	2
<b>Grand Total</b>	<b>109</b>

There was a significant (34%) decrease in serious, severe and critical injuries between 2014 and 2015.

Chart 10 summarizes crew member injuries by severity for calendar years 2006 – 2015. From 2006 to 2015, 71% of injuries were minor or moderate in severity. This compares well with 2015 data, where 73% of crew member injuries were minor or moderate in nature.

**Chart 10 - Injuries by Severity (CY 2006-2015)**

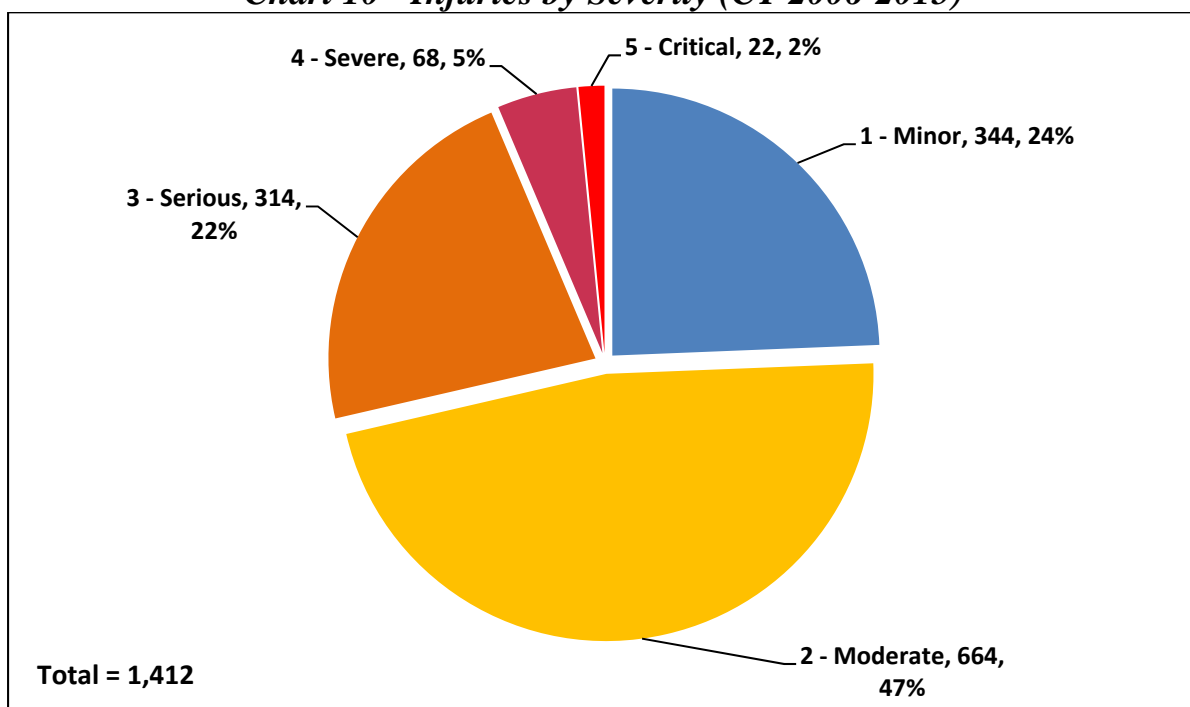
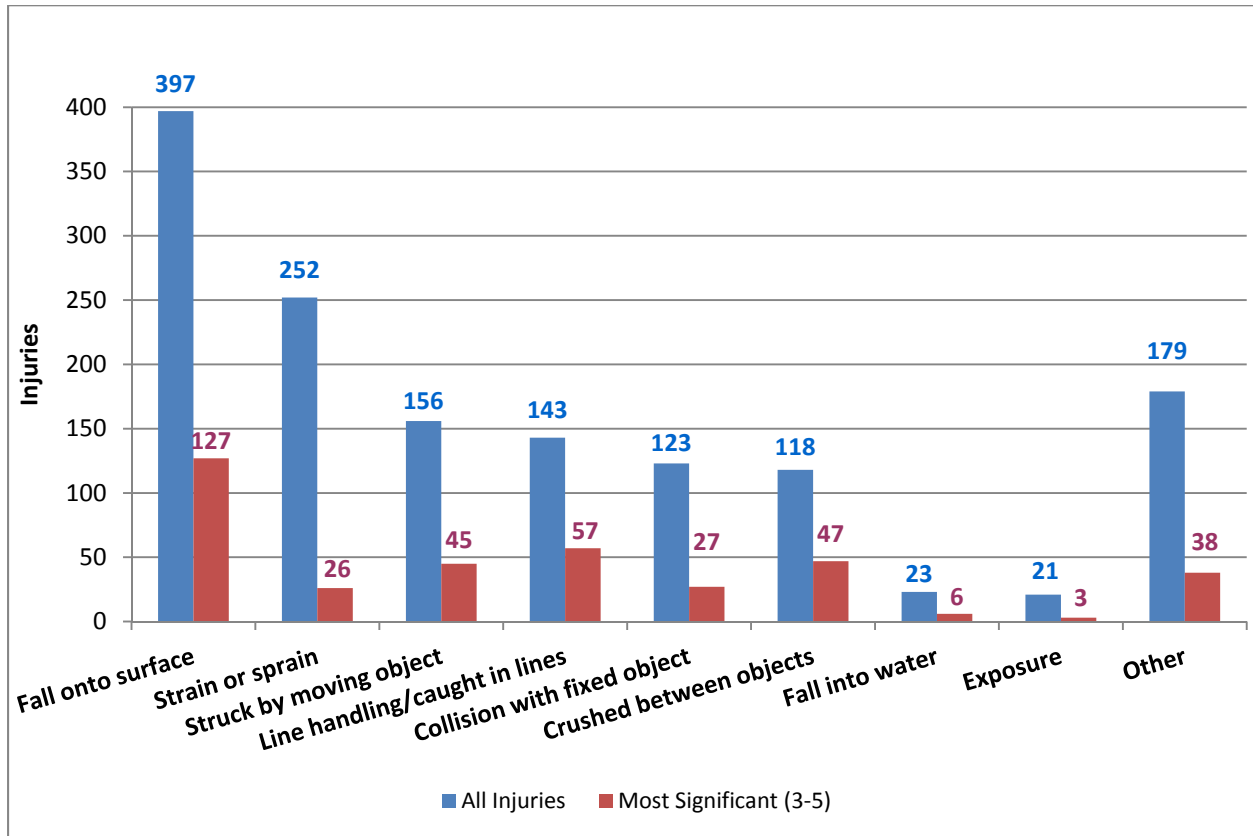


Chart 11 shows injury data by severity and accident type. The accident types most commonly associated with higher severity injuries are:

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

**Chart 11 - Injuries by Accident Type (CY2006 – 2015)**



## 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