American
Waterways
Operators

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

National Quality Steering Committee Meeting

February 2020

Established Safety Metrics

For 19 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 vessel casualties (overall and by incident severity)

This report contains freight carrying towing industry data and measures for calendar years 1994 to 2018.

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

Crew Fatalities

In 2018, there were four operational towing vessel crew fatalities. While 14 deaths were reported to the Coast Guard involving freight carrying towing industry vessels, only four of the deaths were directly related to towing vessel operations and involved crewmembers. The following is a summary of the four crew deaths related to towing vessel operations:

- Two crewmembers drowned when a towing vessel capsized after getting entangled in the anchor gear of another vessel. The crewmembers were below deck when the vessel capsized.
- A crewmember slipped on an icy deck while moving between two barges and fell into the water. The crewmember was subsequently crushed between the two barges.
- The master of a towing assist vessel lost consciousness, and the vessel then allided with a pier resulting in the death of the master due to blunt force trauma.

Of the ten, non-operational or non-crewmember deaths reported: six deaths were due to pre-existing medical conditions; one death was the result of a suicide; one death was the result of an intoxicated crewmember falling overboard while the vessel was moored; and two reported deaths involved contractors or non-crewmembers (one contractor took off his lifejacket and then fell overboard while leaving the vessel, and another contractor was killed when a crane barge capsized during training).

Chart 1 shows the annual operational crew fatality count, along with the linear trend line and 5-year moving average for calendar years 1994 through 2018.

Chart 1 – Operational Crew Fatalities by Calendar Year (CY)

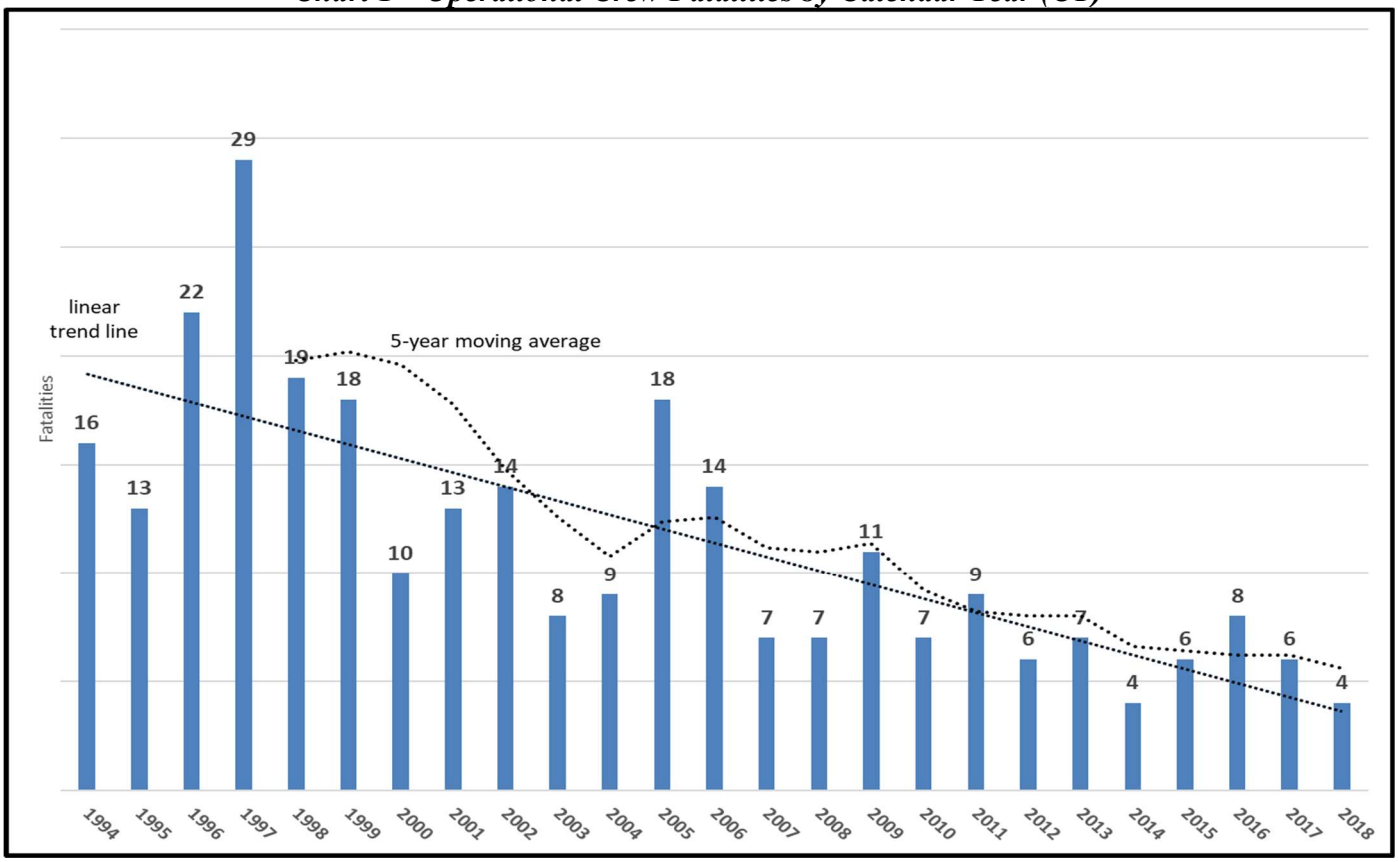


Chart 2 shows the distribution of crew fatalities by accident type for calendar years 2000 to 2018. The largest number of crew fatalities is attributed to falls overboard (79 of 168, 47.0%). The next largest group of fatalities is attributed to asphyxiation (29 of 168, 17.3%).

Chart 2 - Crew Fatalities by Accident Type, CY 2000-2018

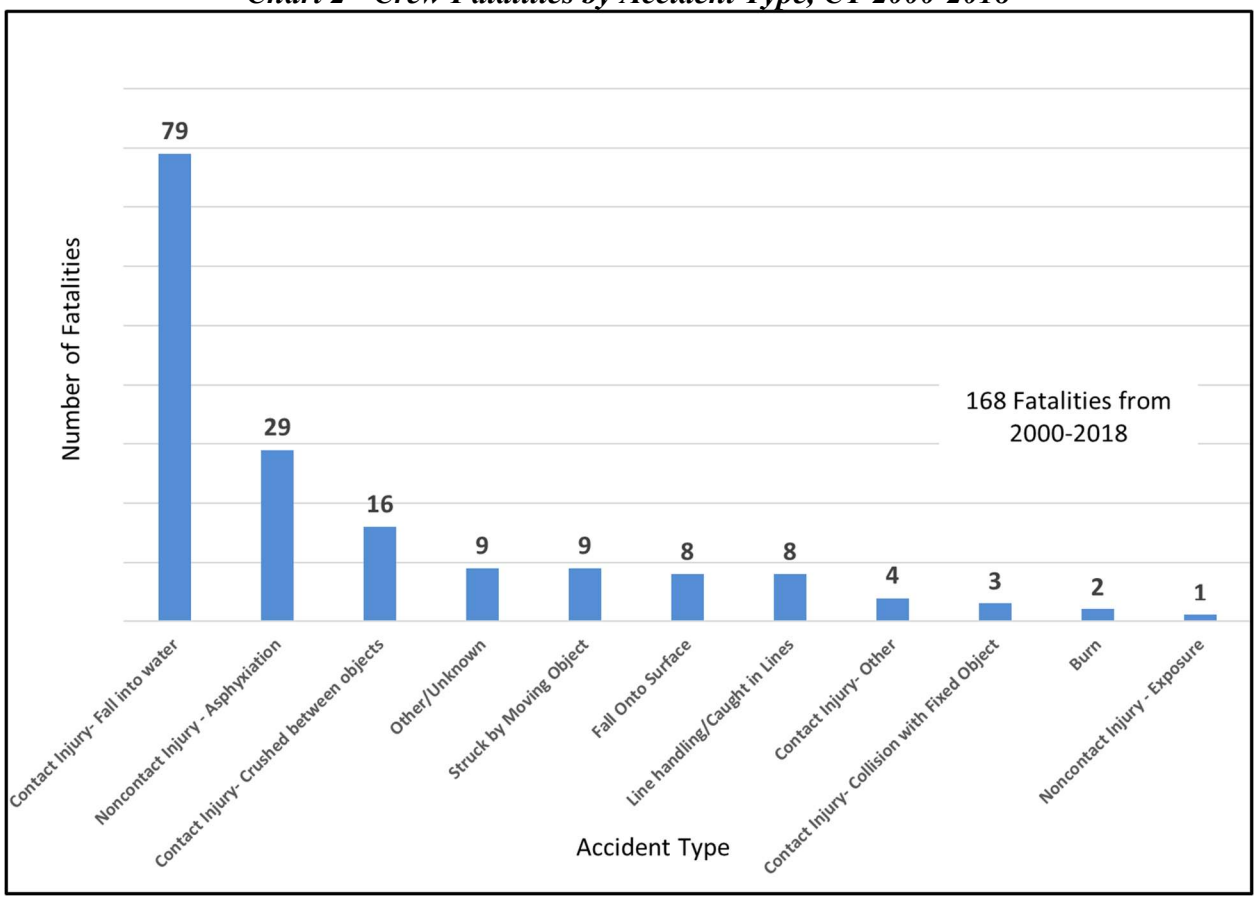
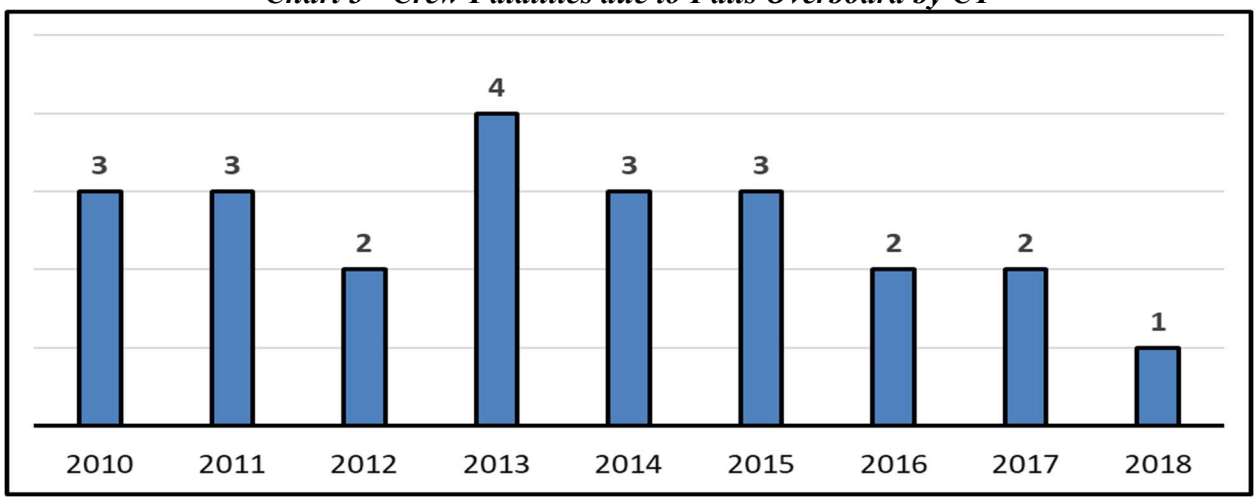


Chart 3 shows the number of crew fatalities resulting from falls overboard for calendar years 2010 to 2018. As mentioned previously, only one of the four crew fatalities in 2018 was attributed to a fall overboard.

Chart 3 - Crew Fatalities due to Falls Overboard by CY



Crew Fatality Rate

The crew fatality rate for 2018 was 4.1 per 100,000 FTE[1]. Chart 4 shows the crew fatality rate from 1994 to 2018. 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)[2].

Chart 4 - Crew Fatality Rate per 100,000 FTE by CY

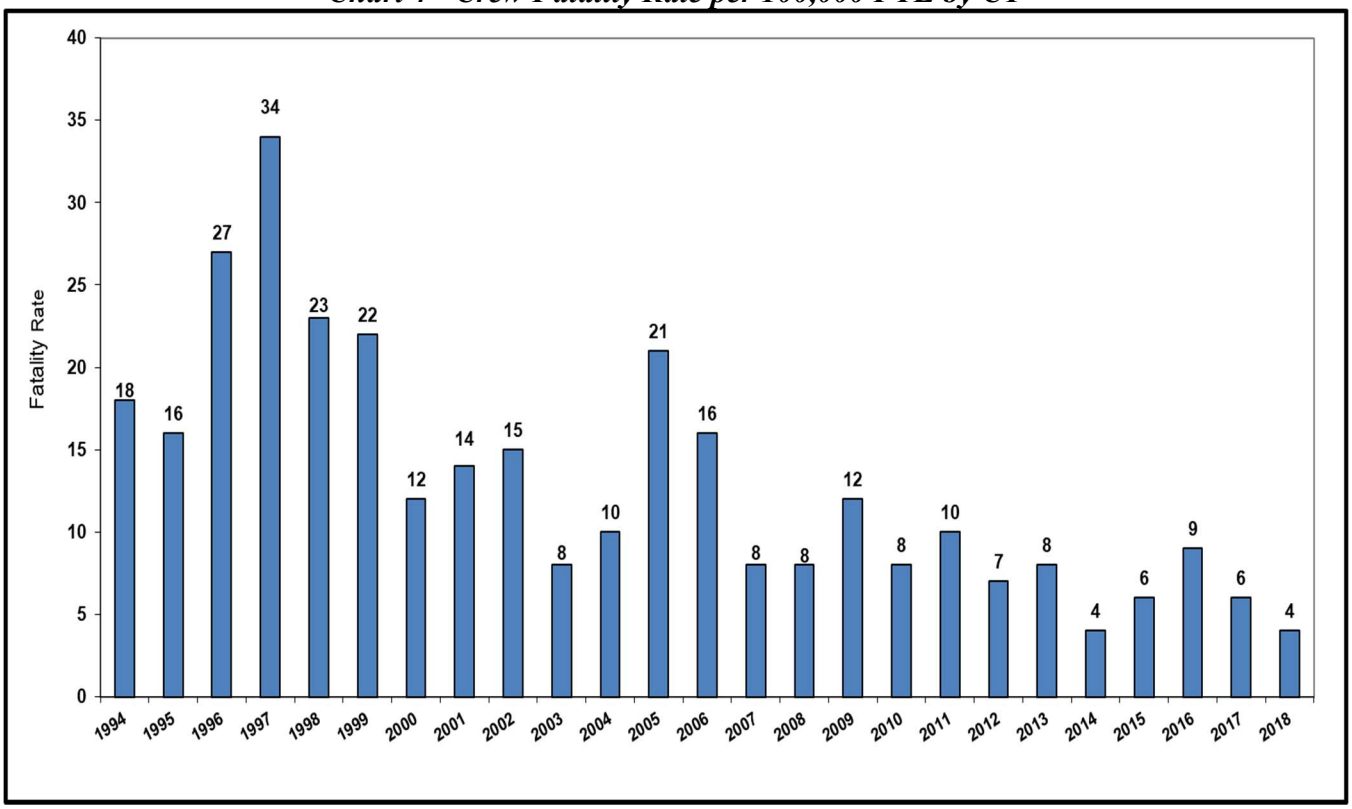


Table 1 shows the fatality rates per 100,000 FTE as calculated by the Bureau of Labor Statistics (BLS) for all workers from 2012 to 2017[3]. Additionally, Table 1 shows the fatality rates for the transportation sector and towing industry. For 2017, the towing industry fatality rate was 6.2, which is less than half of the 2017 BLS worker fatality rate for the transportation sector (15.1), but almost double the rate of the 2017 BLS worker fatality rate for all fatal work injuries (3.5).

Table 1 - Comparison of Worker Fatality Rates

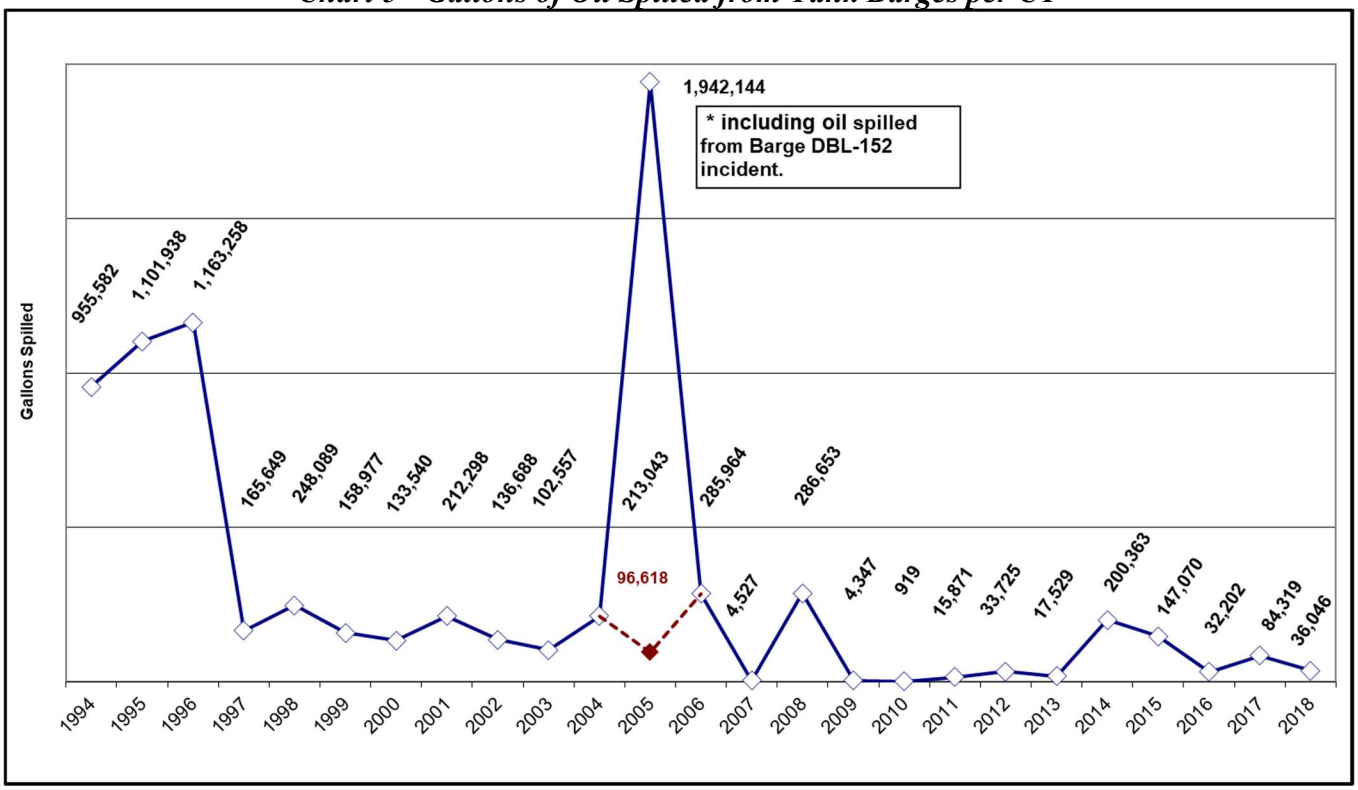
	Worker Fatality Rates per 100,000 FTE					
	2012	**2013**	**2014**	**2015**	**2016**	**2017**
Bureau of Labor Statistics (BLS), All Fatal Work Injuries	3.4	3.3	3.4	3.4	3.6	3.5
BLS, Transportation Sector Fatal Work Injuries	14.6	14.4	15.4	14.7	15.4	15.1
Towing Industry, Crewmember Operational Fatal Work Injuries	6.7	7.8	4.4	6.7	8.6	6.2

[1] An FTE or Full Time Employee is the equivalent of one person working a 40-hour work week, for 50 weeks of the year.
[2] *Waterborne Transportation Lines of the United States, Calendar Year 2018, Volumes I to III*, Army Corps of Engineers, published November 2019.
[3] *Census of Fatal Occupational Injuries Charts, 1992-2017*, https://www.bls.gov/iif/oshwc/cfoi/cfch0016.pdf

Oil Spill Volumes

Coast Guard records indicate 36,046 gallons of oil was spilled into U.S. navigable waterways as a result of 55 operational tank barge pollution incidents in 2018. Chart 5 shows the total gallon quantity of oil spilled from tank barges for calendar years 1994 to 2018.

Chart 5 - Gallons of Oil Spilled from Tank Barges per CY



The largest oil spill in 2018 resulted from an allision between a barge and moored vessel in Port Arthur, Texas. While a tug and barge were maneuvering alongside a deep draft vessel, the barge struck the after port quarter of the deep draft vessel, resulting in a five foot gash in the starboard tank on the barge and the discharge of 26,020 gallons of ultra-low sulfur marine diesel into the Sabine-Neches waterway. This spill accounted for 72.2% of the total volume of oil spilled in 2018.

The second largest oil spill in 2018 resulted from an allision between a barge and a concrete finger pier in the Lower Mississippi River. Prior to the incident, several barges and two tugs were temporarily moored to a piling in the river. The tugs and barges were set adrift when then the piling shifted and the mooring lines slipped from the piling. One of the barges struck a concrete finger pier resulting in a 15 foot by 6 foot hole in the above deck portion of the No. 2 starboard cargo tank and the discharge of 9,450 gallons of biodiesel into the Mississippi River. This spill accounted for 26.2% of the total volume of oil spilled in 2018.

These two spills accounted for 98.4% of the total volume of oil spilled from tank barges in 2018.

Table 2, on the following page, shows the number of oil spills by spill size category, as well as the amounts (in gallons) of the five largest oil spills.

Table 2 - Oil Spills by Spill Size Category for CY 2018

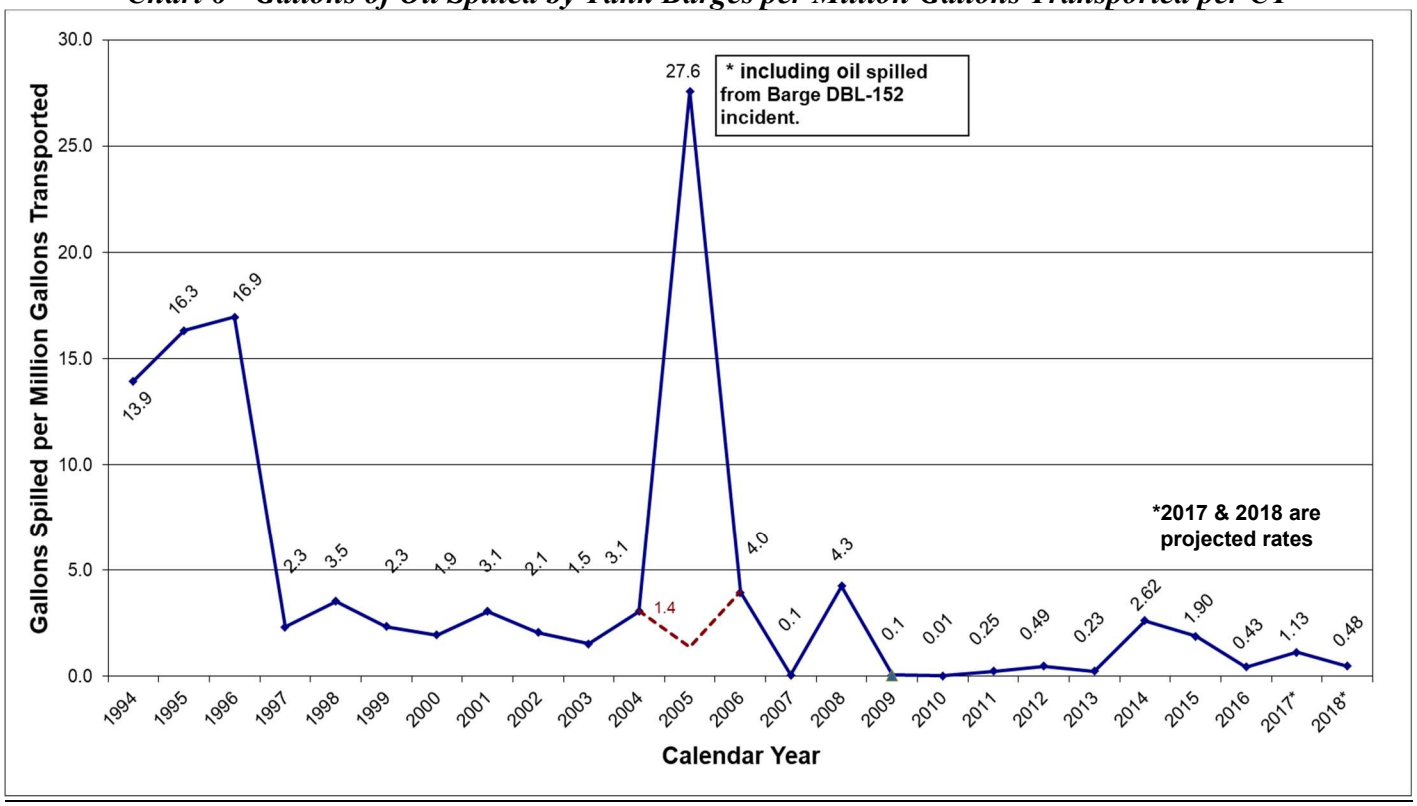
Category (gallons)	# of Spills	Top 5 Largest Spill Amounts (gallons)
more than 10,000	1	26,020
1,000 to 10,000	1	9,450
100 to 1,000	2	243 and 210
10 to 100	1	20
1 to 10	42	---
less than 1	8	---
Total	**55**	**36,046**

Oil Spill Rate

The projected oil spill rate for 2018 is approximately 0.48 gallons of oil spilled for every million gallons transported, or one gallon of oil spilled for every 2,083,222 gallons transported. Chart 6 shows the oil spill rates from 1994 to 2018.

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,* Part 5, National Summaries. The latest version of the publication available is for calendar year 2016; therefore, the 2017 and 2018 rates are a projection based on 2016 data.

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



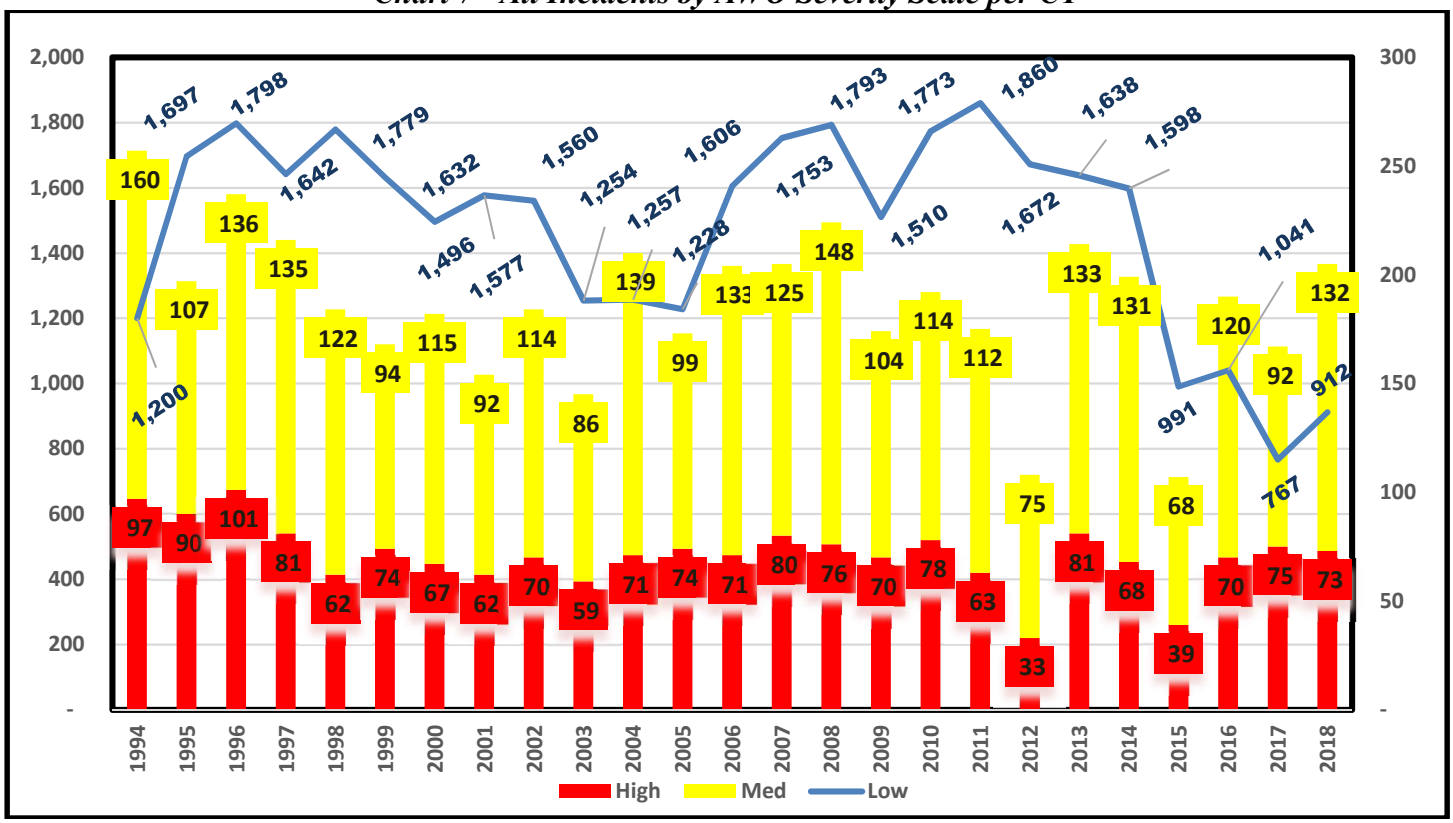
Severity of Vessel Incidents

In 2018, there were 1,117 incidents involving towing vessels or barges that resulted in Reportable Marine Casualties. The most commonly cited Initiating Event[4] for these incidents was: Grounding (24.2%), Material Failures or Malfunctions (22.9%), Allision (18.8%), or Loss/Reduction of Propulsion/Steering (18.0%).

All incidents for 2018 were also scored on the Severity Scale developed by the AWO National Quality Steering Committee. A description of the Severity Scale is provided at the end of this report. In 2018, there were 73 (6.5% of total) High Severity incidents, 132 (11.8%) Medium Severity incidents, and 912 (81.6%) Low Severity incidents. Medium and High Severity incidents accounted for 205 of the 1,117 (18.4%) incidents. In comparison, 79 of the 1,117 incidents (7.1%) were considered "Serious Marine Incidents" as defined in 46 CFR 4.03-2.

Charts 7 shows the number of towing vessel incidents reported and classified by the AWO Severity Scale from 1994 to 2018. 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.

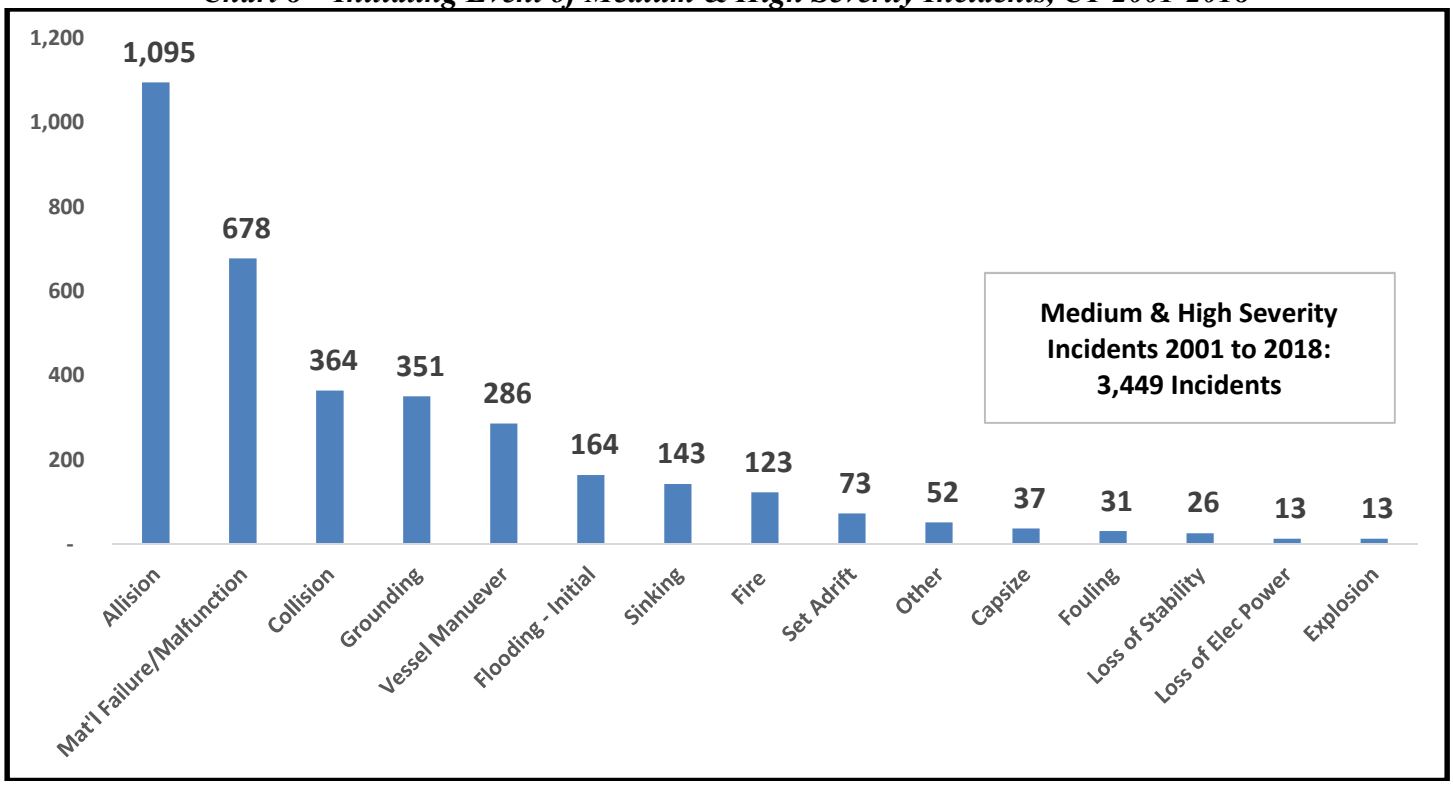
Chart 7 - All Incidents by AWO Severity Scale per CY



[4] The Initiating Event is the first unwanted event in a sequence of events associated with a marine casualty. For example, if a vessel's engine breaks down due to a mechanical failure and the vessel subsequently runs aground, then the mechanical failure is considered the initiating event.

The most commonly cited initiating events associated with the 205 Medium and High Severity incidents from 2018 are as follows: Allision (36.6% of total), Material Failures or Malfunctions (16.1%), Grounding (10.2%), and Loss/Reduction of Propulsion/Steering (6.3%). Chart 8 shows the Initiating Event associated with Medium and High Severity incidents for the period of 2001 to 2018.

Chart 8 – Initiating Event of Medium & High Severity Incidents, CY 2001-2018



Crew Member Injuries

In 2018, there were 115 incidents onboard towing vessels or barges that resulted in injuries to 120 crewmembers. Six incidents resulted in injuries to multiple crewmembers. Table 3 provides a breakdown of the injuries by severity category, and Table 4 provides the number of critical, severe, and serious injury accidents by accident type for CY 2018.

Table 3 - Number of Injuries by Severity Category, CY 2015-2018

Injury Severity	2014	2015	2016	2017	2018	Total (%)
Critical	1	4	0	0	1	6 (1.1%)
Severe	11	2	5	2	5	25 (4.5%)
Serious	32	23	20	15	22	112 (20.3%)
Moderate	67	46	39	35	50	237 (43.0%)
Minor	22	34	36	37	42	171 (31.0%)
Total	**133**	**109**	**100**	**89**	**120**	**551**

Table 4 - Critical, Severe, Serious Injuries by Accident Type for CY 2018

Accident Type	# of Accidents
Contact Injury- Fall onto surface	9
Contact Injury- Crushed between objects	8
Contact Injury- Line handling/caught in lines	5
Contact Injury- Struck by Moving Object	3
Overexertion Injury- Strain or sprain	2
Contact Injury- Other	1
Total	**28**

The one "critical" injury in 2018 was the result of an unstable barge rolling over and crushing a mate who was on an adjacent barge. As a result, the mate's legs were partially severed above the knee. The five "severe" injuries in 2018 were the result of crewmembers being caught in rigging/lines (3 incidents) or crewmembers being injured during crane operations (2 incidents). There were 22 "serious" injuries in 2018. Falls (9 of 22, 41.0%) and being crushed between objects (7 of 22, 31.8%) were the most common accident types associated with "serious" injuries.

AWO Severity Scale 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 - 1,000 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 CG Casualty Class: "Serious" or "Major"

USCG Injury Severity Scale