

Collisions, congestion, and closures

Several major collisions and pollution events have occurred in the Houston Ship Channel over the past few years, and raise questions over potential safety issues in this busy waterway

Gabriella Twining, SAS reporter

Last year was a dangerous one for vessels traversing the 84-km waterway known as the Houston Ship Channel. Due to high traffic volume and its narrow, shallow, and winding characteristics, the channel is one of the busiest and challenging waterways to navigate in the world according to Akshat Arora, senior surveyor at Standard P&I Club.

In early 2019 a serious collision led to fatalities on the waterway. On 14 January, the Norwegian-flagged chemical tanker *Bow Fortune* collided with fishing vessel *Pappy's*

Pride at the entrance of the channel. This caused the 24 m fishing vessel to capsize and four crew members were thrown into the water. The US Coast Guard (USCG), which carried out the rescue mission, reported that two of the fishermen were rescued by a vessel and sent to the USCG rescue station.

However, one of the rescued fishermen was unresponsive and later died in hospital, while the remaining two were declared lost at sea after an extensive search carried out by the USCG was called off on 16

January. The USCG cited this was due to dense fog conditions and the window of survivability of the fishermen had passed. "It's never easy to suspend a search," said commander Jordan Balduenza, search-and-rescue mission co-ordinator for the Houston-Galveston area. The incident is still being investigated by the National Transportation Safety Board (NTSB) and USCG.

While the investigation continues, thousands of vessels continue to transport goods through the Houston Ship Channel. One of the world's busiest waterways, according to Port Houston, it has an estimated 247 million tonnes of cargo moving through it to the port annually, transported by more than 8,200 vessels and 215,000 barges. This has made the waterway vital to the local economy surrounding the channel, stretching from the Gulf of Mexico to Houston and Harris County, Texas, which generates an estimated USD802 billion a year for the country's economic value.

"The shores of the Houston Ship Channel are home to one of the biggest petrochemical complexes in the world," said Arora. As such, petroleum and petroleum-related products are the leading exports and imports along the channel. With such high volumes of vessels carrying highly flammable and pollutant cargo, the channel has been a hot spot for collisions and pollution incidents.

On 10 May 2019, the 230 m tanker *Genesis River* collided with a tug transporting two bunker barges in the channel,

causing one of the barges to capsize and damaging the other. While no injuries were reported, the USCG said that damage to the barge caused an estimated 12,000 barrels of gasoline blend stock to be released into the water.

Part of the channel was closed completely for a day for the Office of Response and Restoration's Emergency Response Division to analyse the damage and conduct the Shoreline Cleanup Assessment Technique to survey affected shoreline.

The emergency response team used seven skimmers to recover the product-water mixture and placed about 6,000 m of boom around the barges and surrounding sensitive shoreline areas to help contain and absorb the gasoline product. The channel was reopened for one-way traffic the following day, with around 100 delayed vessels in both directions waiting for access.

Immediately after the spill, Galveston County residents complained that there was a strong smell of gasoline in the air to the Texas Environmental Justice Advocacy Services, a non-profit advocacy group. This was confirmed by the Centres for Disease Control and Prevention, moreover the Texas Commission on Environmental Quality detected high levels of benzene, a known carcinogen, in the air just seven hours after the collision. The benzene concentration was nearly 14 times higher than the level of concern for short-term health effects.

However, ecologists working in the area confirmed that

A fire at the Intercontinental Terminals Company tank farm in Deer Park, Texas



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Workers with the environmental services clean up oil at East Beach on the Houston Ship Channel

further air samples were taken and analysis showed no actionable levels of toxins in the air. “In this spill there were volatile compounds that quickly got into the air,” said Erin Kinney, coastal ecology research scientist for the Houston Advanced Research Center. “It has the potential to affect air quality — I believe that’s what people could smell — but the risk dissipated fairly quickly for this one.”

The rapid response taken by the emergency services to contain the spill and remove the barges has also been cited as a reason for the relatively low environmental impact. “The response was very rapid, they were able to get out there and boom off most of the spill fairly quickly and it was well-co-ordinated. I think we are getting better at responding quicker and at containing a spill,” said Kinney.

It is not just the collisions and subsequent pollutions that jeopardise maritime safety in the channel, the highly hazardous nature of the imports and exports also plays a part. One of the most serious incidents on the waterway to date occurred on 17 March 2019, when a fire erupted at the Intercontinental Terminals Company (ITC) chemical storage terminal, Deer Park, alongside the channel. The fire burned for four days, damaging 11 tanks holding 80,000 barrels worth of chemicals, including naphtha, xylene (both used in gasoline), and toluene (a solvent used in nail polish remover, glues, and paint thinners). The fire led to school closures and shelter-in-place orders.

A dike wall in the terminal was breached, causing a mixture of chemicals, gasoline, and firefighting foam to spill into the channel and an estimated half of the channel

was closed for three days. More than 1,100 state, federal, local first responders, and agency workers were involved in the firefighting, containment, and clean-up operations around the channel. More than 95 million litres of water-mixed chemical product were collected from the terminal and Houston Ship Channel.

“Being one of the busiest waterways, any cut-off could potentially cost the region’s oil, gas, and petrochemical sectors USD1 billion in lost revenues. Apart from the direct costs of delayed shipments there are indirect costs involved, such as rerouting shipments to other ports,” Arora said regarding the economic impact of the channel closure.

The cleanup following the fallout from the ITC fire took weeks to carry out. Despite efforts, some chemicals from the fire were still present in the waterways in August 2019, according to the Galveston Bay Foundation, though in much lower levels.

The district attorney’s office, on behalf of Harris County, filed five environmental criminal charges against ITC, with the law office citing “criminal levels” of contamination in a press statement.

Texas Chicken ‘Dance’

In such a busy waterway, how vessels pass each other in the channel can add to the precariousness of the situation. “The channel operates for inbound and outbound traffic simultaneously with no adoption of dedicated lanes for the opposing streams,” said Arora. As such, the so-called Texas Chicken Manoeuvre is employed. “Vessels that

are as long as a football field and sometimes half as wide close in on each other at a combined speed of just under 20 mph,” noted Lane Kelly, a representative from Independent Commodity Intelligence Services, a petrochemical market information provider.

“They [the vessels] head directly into each other, and then breakaway at the last minute, when the other vessel is within half a mile. Water pressure keeps them apart,” Kelly said. The vessels essentially are aiming for a head-on collision and rely on the other’s wave pressure to veer starboard and safely past; the role of ship pilots in this manoeuvre is paramount.

“Undoubtedly, this manoeuvre requires a perfect orchestrating between highly skilled pilots of both vessels,” concurred Arora. “However, as ship sizes have grown over the years, the channel has not. Thus, some ships are deemed too large to safely accommodate this manoeuvre.”

While there have been many collisions in this waterway, no reports have explicitly blamed the manoeuvre as the main cause for these incidents. Negligent pilots, on the other hand, have been cited frequently. The NTSB blamed “the failure of the pilot” in three events: in a collision involving a tanker in 2011; in the March 2016 collision between bulk carrier *Conti Peridot* and tanker *Maersk Carla*; and again in a 2018 crash between moored barge *OSG Independence* and bulker *Yochow*.

“We’re still trying to stuff these bigger ships up these tiny ditches,” said captain Mike Morris, retired officer of the Houston Pilots, the corps of mariners who navigate the ships up the channel.

“From a human element aspect, the transits can be long, so fatigue is a big factor,” said Arora. However, the NTSB also criticised the USCG for not “ensuring adequate separation between vessels in the Houston Ship Channel” in a 2011 incident report of a collision between a chemical tanker and a container ship, adding to the argument that the channel is far too congested.

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Lane Kelly, representative of Independent Commodity Intelligence Services

Bigger is better?

According to IHS Markit data, the volume of cargo being transited on the Houston Ship Channel to the port of Houston has increased 11.4% in 2019. This is the third consecutive year of double-digit growth for the port, and as of November 2019 2.27 million teu arrived at the port.

The size of vessels on the waterway has been a bone of contention for the Houston port pilots. “As ship sizes are getting bigger, the navigable depth and width of the

channel poses the biggest challenge,” said Arora. In September 2019, a law signed by Texas governor Greg Abbott came into effect, which prohibited vessels of 9,500 teu and above from entering the channel without approval from 80% of the port pilots.

Previously vessels of that size were limited to traversing the channel once a week, as certain parts would have to be closed for one-way traffic to allow for such large vessels to pass. This would mean a closure of up to 10 hours or more and cause monumental delays for other vessels transiting the channel, as they would have to wait for the vessel to dock or exit the waterway. Such ships, averaging 350 m in length, are too large to safely accommodate for the Texas Chicken Manoeuvre as they present a 54% wider profile when they reach the passing angle. The law was welcomed and even advocated by the energy companies operating in the area, whose smaller barges and crude carriers compete for space with the ever-larger container vessels traversing the busy waterway.

However, since 2010, there has been a proposed project to deepen and widen the Houston Ship Channel to meet growing demand and improve safety for vessels navigating the channel. The port of Houston, which is championing an expansion work known as Project 11, has partnered up with the US Army Corps of Engineers and other private investors to widen the channel by 52 m to a total of 213 m along the Galveston Bay section. Certain upstream segments will also be deepened to 14 m. Works are scheduled to begin in early 2021, and are expected to create more space for vessels to manoeuvre in the channel and relieve some of the congestion it is currently suffering. The upcoming project would also eliminate the need for the Texas Chicken Manoeuvre, potentially creating a safer environment for vessels to pass each other.

However, with ever-larger container, crude oil carriers, and other vessel types being constructed and hitting the market, along with the increasing number of vessels transiting the channel, it could be said that Project 11 has more to do with capitalising on the increasing capacity rather than improving safety.

Until the works are completed, ships will continue to face the same issues that make navigating in the Houston Ship Channel a skillful and potentially risky task; ships will continue to increase in volume and traverse the narrow width of the channel, and the Texas Chicken Manoeuvre will continue to be used. While pilots have often borne the brunt of the blame for collisions, most agree that widening the channel will help to resolve some of the issues with navigating safely in high vessel traffic.

“The combination of tidal and traffic flows, particularly towboats and barges, is a major cause of accidents. Until the herculean task of widening and deepening the Houston Ship Channel gets under way, regulating convoys of opposing traffic could act as a possible mitigating measure,” concluded Arora. Widening the channel will likely lead to even more vessels traversing the waterway, but it could end up nullifying the expected safety benefits of the expansion. [E](#)