

# Aviation Human Factors Industry News

Volume XV. Issue 18, September 01, 2019



From the sands of Kitty Hawk, the tradition lives on.

Hello all,

To subscribe send an email to: [rhughes@humanfactorsedu.com](mailto:rhughes@humanfactorsedu.com)

In this weeks edition of *Aviation Human Factors Industry News* you will read the following stories:

★UA 232's Al Haynes Dies At 87

★Earnhardt Pilots Said Go Around Problem Preceded Crash

★The Little Things

★Emirates Airbus A380 damaged during Dubai maintenance work

★DGCA issues fresh guidelines to improve working conditions of aircraft maintenance personnel

★Grappling Grief

★FAA Notice Warns of Damage to AOA Sensors

★Deadlines Set for Australia's Pilot Fatigue Rules

★How cost, lack of practice, could be contributing to small plane crashes

## UA 232's Al Haynes Dies At 87

Captain Al Haynes, who landed a crippled DC-10 at Sioux City, Iowa, in 1989, saving more than half the passengers, died in Seattle Sunday after a brief illness. He was 87 years old

.In an accident hailed as an [exceptional example of crew resource management](#), Haynes landed the DC-10 at Sioux City on July 19, 1989, after an uncontained fan disc failure in the center engine destroyed the aircraft's hydraulic systems.



Assisted by his scheduled crew and deadheading training captain Dennis Fitch, Haynes diverted United Airlines flight 232 to Sioux City while enroute from Denver to Chicago.

Lacking pitch and roll control because of the hydraulic failures, the crew controlled roll and heading with differential thrust. Following a difficult approach, the DC-10 landed fast at Sioux City, breaking up on touchdown. Of the 296 passengers and crew aboard, 185 survived.

Haynes' performance was [lauded as an exemplar](#) of crew resource management. Haynes had been a pilot in the U.S. Marines before joining United Airlines in 1956. He retired in 1991 after 35 years of service with the airline. He traveled and spoke frequently about lessons learned from the UA 232 accident.

## Earnhardt Pilots Said Go Around Problem Preceded Crash

The pilots of Dale Earnhardt Jr.'s Citation Latitude told the NTSB [the aircraft "did not respond as expected"](#) as they tried to go around after a rough landing at Elizabethton Airport in Tennessee earlier this month.



In the preliminary report on the Aug. 15 accident, which destroyed the aircraft and resulted in minor injuries to Earnhardt, his wife and their baby, the NTSB said the [crew called it quits after the second bounce](#) on the 4500-foot runway after an uneventful 20-minute VFR flight on a calm, mostly sunny day.

It's not clear from the report what anomaly the pilots said they encountered but with more than half of the runway behind them, they set up to land and hit hard with only about 1,000 feet of asphalt left.

The right gear collapsed and the aircraft continued over the grass overrun, through a ditch and across a highway where it caught fire. The pilots got the main door open and helped the Earnhardt family to safety. The pilots were unhurt but the Earnhardts had scrapes and bruises. The cockpit, with its [G5000](#) panel, was undamaged and the data from the avionics was downloaded. Both pilots were experienced, current and hold ATPs.

## The Little Things

Bob Baron, Ph.D

TACG Founder and President

Every time I teach a Human Factors (HF) course, I always like to talk about the little things. What I mean by the little things is [screws, bolts, fasteners and other types of hardware](#). The things that can probably fit in the palm of your hand and only cost a few dollars. Yet, these little things have caused some big maintenance-related aircraft accidents and incidents:



One of the most well-known accidents is [Continental Express Flight 2574](#), an Embraer 120 that crashed in Texas in 1991. All 14 onboard were killed. The accident happened because [47 screws](#) were not put back on the horizontal stabilizer after a shift change.

A de Havilland DHC8, operated by CC Air, lost the number 1 right-hand leading edge on departure from Charlotte, North Carolina. The leading edge panel had been removed for maintenance and the bottom screws had not been reinstalled. The flight crew was able to land the aircraft without further incident.

A de Havilland DHC8, operated by Jazz Air, had a three-foot piece of the wing leading edge (with the de-ice boot attached) separate from the left wing on the takeoff run. The aircraft returned to the departure airport and landed without further incident. When the leading edge section was examined, it was determined that the [14 screws](#) that secure the leading edge section to the bottom of the wing were missing.

An aircraft (undisclosed type) had a tailpipe/thrust reverser depart the aircraft, causing substantial damage to the pylon and engine.

The investigation revealed that only **4 of 42 bolts** holding the tail pipe assembly were tight. This was due to a lack of documentation during a shift turnover to inform the incoming crew that 38 of the 42 flange bolts that held the assembly to the core were loosened. The examples could go on and on...

What was the **common thread** in each of these accidents and incidents? The maintenance errors occurred during **shift turnovers** and they involved **the little things** (screws and bolts). One does not have to be a rocket scientist to figure out what went wrong. It's very straightforward. The errors boiled down to slack shift turnovers that led to screws and bolts being forgotten about due to a **lack of communication**. When something gets taken apart, it usually needs to be put back together again the same way, including the screws and bolts that secure the component.

None of the above accidents and incidents would have happened if procedures were being followed. Aircraft maintenance is not based on luck. It's based on **documented procedures**; procedures that, if not followed, can cause bad things to happen. Forgetting to put back 47 screws on an airplane may not sound like a big deal, but it certainly was for the passengers and crew of Continental Express Flight 2574. **They paid for the error with their lives**. And even though that particular accident happened a few decades ago, the same problem exists with some shift turnovers to this very day. This is totally unacceptable.

Typically not the fault of a single mechanic, these events are almost always the manifestation of an **unhealthy safety culture**, with the mechanic simply acting as a trigger puller for upstream organizational pathogens that have been lying dormant in the system for years.

HF training helps to prevent these types of events from occurring, **but HF training is not a magic bullet**; it's an awareness building tool, and it's still up to each and every single maintenance organization to support the transfer of learning from the classroom to the hangar floor. That means that management must be onboard!

In closing, I can teach you all you need to know about HF. But in the end, it's up to your organization to foster a safety culture that will prevent the little things from causing big problems. **Take a good look at your shift turnover process**. Are procedural deviations becoming the norm?

Are shift turnovers too casual, where there's a lack of communication (documented, verbal, or both) between the incoming and outgoing shifts? If you answered yes to one or both of the above, you might be heading for trouble. And that trouble might just be due to the little things.

<https://www.tacgworldwide.com/>

## **Emirates Airbus A380 damaged during Dubai maintenance work**

A maintenance mishap has left an Emirates Airbus A380-800 with serious damage to its nose and surrounding structure.

The aircraft, registered A6-EOP, was undergoing a routine maintenance check when the aircraft collapsed onto its nose.



Occurring at an Emirates maintenance hangar at Dubai International Airport, the accident has left the aircraft with a torn/crumpled fuselage and structural damage.

It's understood the aircraft slipped off a hydraulic jack, crushing the nose, gear doors and jamming the gear assembly upwards.

Once raised off the ground, a thorough check will be conducted to determine the full extent of the damage.

Built in 2015, as MSN200, the aircraft has actively been in service with the airline, powering through the skies with four Engine Alliance GP7200 engines.

**Update:** It's being recorded that this accident happened on the 22nd of August and may have been caused by a gear retraction without the pin in place.

## **.DGCA issues fresh guidelines to improve working conditions of aircraft maintenance personnel**

- 1 The watchdog has asked aircraft maintenance organizations (AMOs) to [frame policy to address duty time limitation](#) for AMP
- 2 The advisory also comes against the backdrop of a recent incident at Kolkata airport where a SpiceJet technician died after he got stuck in the main landing door while working on an aircraft.

**NEW DELHI :** Aviation regulator DGCA has issued [a fresh set](#) of guidelines on duty time limitations for aircraft maintenance personnel. The advisory is being issued to [improve the working conditions](#) of aircraft maintenance personnel (AMP), a senior DGCA official said on Friday.



The watchdog has asked aircraft maintenance organizations (AMOs) to frame policy to address duty time limitation for AMP.

"While framing the policy for duty time limitation by an AMO, the factors affecting the [physical and mental performance](#) of an individual should be considered to avoid any [mistake or error](#) in maintenance, which may jeopardize the airworthiness, safety of aircraft and the individual," it said.

As per the advisory, all organizations should document their scheduled shift pattern(s), system and procedure in their MOE (maintenance organization exposition) or procedure manual, among others, for effective fatigue management of their AMP.

"The system or procedure should also define [the roles and responsibilities of personnel entrusted with managing duty time limitations](#) for AMP," it added.

The advisory also comes against the backdrop of a recent incident at Kolkata airport where a SpiceJet technician died after he got stuck in the main landing door while working on an aircraft.

According to the regulator, the airworthiness advisory circular (AAC) has been prepared primarily for those engaged in aircraft maintenance certification activities. It is also relevant to all other personnel related with aircraft maintenance, [including technicians, inspectors and supervisors](#).

Among others, the advisory said that fatigue builds up over a period of work and this can be partially ameliorated by the provision of breaks. "Therefore, working longer duration without any break should as far as possible be avoided. Duration of break should be planned taking into account the logistic and other constraints," it added.

## **Grappling Grief**

Pilots are keenly aware about physical issues that might ground them from flying, [including](#) vision problems, cancer, and heart trouble. But mental and emotional issues can also cause problems if brought onto the flight deck.

One of them is grief—the [human response](#) to losing someone or something we cherish.

But even though they're often unwilling to admit they need help coping with grief, pilots don't have to do it alone.



## [LISTEN TO THE EPISODE](#)

### [FAA Notice Warns of Damage to AOA Sensors](#)

The FAA has issued Information for Operators (InFo) 19009 to advise pilots and maintenance personnel [of the potential for damaging angle of attack \(AOA\) sensors](#) on aircraft. Based on continued airworthiness activity on multiple foreign and domestic large transport aircraft and small general aviation aircraft, the FAA has determined it is necessary to advise operators of the importance of performing proper operations and maintenance on AOA sensors. “It is imperative that all operators are [aware of the criticality of AOA sensors](#) and the potential for damage during normal operations, maintenance, and any other procedures around an aircraft where damage to an AOA sensor could occur,” the FAA cautioned. “Operators can find the requirements for maintaining this component in the instructions for continued airworthiness (ICA).”



In addition, all pertinent personnel “should review current procedures identified in their appropriate operational, maintenance, or servicing manuals. The review should ensure that the manual adequately identifies all aspects and appropriate policies/procedures around AOA sensors.”

The most recent serious issue involving a malfunctioning AOA sensor concerned those on the Cirrus SF-50 Vision. Three in-flight incidents of un-commanded engagement of the single-engine jet’s stall warning and/or stability protection systems caused by the AOA sensor prompted the FAA in April to temporarily ground the fleet. In June, the FAA published a new AD mandating replacement of the aircraft’s AOA sensors with improved ones.

[https://content.govdelivery.com/attachments/USAFAA/2019/08/19/file\\_attachments/1268693/InFO19009.pdf](https://content.govdelivery.com/attachments/USAFAA/2019/08/19/file_attachments/1268693/InFO19009.pdf)

## **Deadlines Set for Australia’s Pilot Fatigue Rules**

Australia’s Civil Aviation Safety Authority (CASA) has finalized [new crew fatigue rules](#) that apply to holders of commercial air operator certificates (AOCs), including charter, on-demand air taxis, and Part 141 flight schools. The rules go into effect September 2 and provide for up to a one-year phased-in transition period for non-airline AOCs.



The rules require operators to follow prescribed limits within the regulation or develop their own fatigue risk management system (FRMS) that subsequently must be approved by CASA.

In either case, operators [must submit compliance transition plans](#). The rules do not apply to non-CASA-certified commercial operators.

Airlines must transition to the new rules no later than July 1, 2020, regardless of whether they select the prescribed limits or apply for FRMS approval. All other AOC holders and Part 141 operators must transition to the regulatory limits by June 30, 2020, or submit an FRMS application no later than that date. Charter, air taxi and Part 141 operators that apply for an FRMS must be operating under a trial FRMS implementation approval (or revert to prescriptive limits) no later than Sept. 30, 2020. The rules will be effective for them starting Oct. 1, 2020.

The new regulation is based on the recommendations of an [“expert review panel and extensive industry consultation](#) and involvement, including CASA’s Aviation Safety Advisory Panel and an industry technical working group,” CASA said. “The rules seek to align Australia with international standards, improve aviation safety, address known risks and maintain our reputation for safety in aviation.”

[https://www.legislation.gov.au/Details/F2019L01070/Html/Text#\\_Toc10100395](https://www.legislation.gov.au/Details/F2019L01070/Html/Text#_Toc10100395)

## **How cost, lack of practice, could be contributing to small plane crashes**

### **Nova Scotia**

'We're engaging in a ridiculously risky activity, but [we're moderating the risks](#)'

Operating costs leading to a lack of flying time [could be contributing to crashes](#) involving small planes in Canada.

It has been a deadly year in Canadian skies with 45 people dying in aviation accidents.

Many of the aircraft involved in crashes are [privately owned](#) and operated by recreational pilots.

"The smaller planes in many cases are being flown [by less qualified pilots](#)," said aviation expert John (Jock) Williams.



"That is pilots who have less training, less experience, less practice, so it's likely to be more accident producing than the big planes where the guys are flying ... four or five times a week and they're in practice," said Williams.

Many recreational pilots are only able to fly once or twice a year, according to Williams.

He said the cost to fuel planes and get them checked by mechanics has become so expensive some people [rarely take their planes out](#).

"People just can't afford to do it, so they're [not practicing enough](#) and as a consequence they're having problems," said Williams.

### **Only 38 fatalities in 2018**

The deaths haven't happened on large commercial airliners, but on small aircraft involving small numbers of people.

But there were only 38 aviation fatalities in all of 2018, according to the Transportation Safety Board of Canada.

Most of the people who died this year were [on board single-engine aircraft](#) that collided with land or water, the safety board said.

Everything from tiny two seater ultra-lights, float planes, helicopters and training gliders have been involved in 20 fatal crashes.

But Williams said those crashes don't attract the same kind of attention as bigger ones.

"If you lose a big airplane, let's say you lose an Airbus A380, you could lose 500 people ... and that's really going to hit the newspapers," said Williams, a pilot and former flight safety officer with Transport Canada.

"That's going to take you 250 crashes in a typical light plane, because most light planes are either flown by one pilot or with two pilots onboard and so it's going to take you a long time to come up with the same eye-catching results."

Large commercial planes that carry the majority of Canadians have a very good safety record, according to Kathy Fox, the chair of the safety board. There have been no fatalities on board those aircraft this year.

It's a much different story with small aircraft.

In July alone, 24 people were killed in small aircraft crashes, and there was only one week in the month when someone didn't die, according to safety board statistics.

On July 1, a two-seat ultralight aircraft was flying near Mont St-Grégoire, Que., southeast of Montreal when it ran into trouble. It slammed into some trees and its two occupants were killed.

Two weeks later, a float plane took off from Crossroads Lake in Labrador for a fishing trip with seven people onboard. Search and rescue crews found the plane submerged in Mistastin Lake the following morning with no sign of survivors.

On July 26 in Black Diamond, Alta., a Cessna and a two-seater glider collided in mid-air. The student and instructor in the glider died while the pilot of the Cessna managed to land without injury.

That's just a small sampling of some of the fatal crashes the board is investigating.

The crashes leave some people with a bad impression of civil light plane aviation, said Williams, but he doesn't believe that should be the case.

"In reality, it's a pretty safe way to spend your time as long as you watch very carefully the few very basic rules that exist in aviation."

It's when people break those rules they run into trouble, a sentiment shared by Fox and the safety board.

Fox said most accidents are caused when pilots make mistakes and not the result of mechanical failure.

"If we look overall, the more serious accidents, the accidents that more frequently lead to fatalities, involve operation in weather — poor weather beyond the pilot's capability," she said.

That can result in a pilot losing their bearings.

"People may overestimate their abilities to handle any particular situation, but we've also seen a lot of accidents with a lot of well-intentioned, well-meaning pilots who got themselves into situations they weren't able to handle," said Fox.

The Canadian Owners and Pilots Association represents people who fly recreationally and travel in their own aircraft.

Despite the deaths this year, Bernard Gervais, the president and CEO of the association, said the overall number of aircraft accidents is decreasing, a statement supported safety board research.

In 2008, there were 294 accidents reported to the safety board. That number has dropped consistently over the last 10 years, and in 2018, there were 201 accidents.

The number of fatalities has started dropping, too. From 2008 to 2017 there was an average of 48 fatalities a year.

But, in 2017, there were 34 deaths.

Gervais said the number of accidents a year isn't high given the number of people flying. His group alone has 16,000 members.

"With the number of aircraft out there in the country with the number of pilots we've got, there's a lot of flying going on and ... these accidents, it's just a few a year and it's actually going down," he said.

He said recreational flying is safe.

Fox agrees with him, as long as people obey the rules and are cautious. She's been flying for more than 40 years.

"I teach flying and I feel very comfortable going up in them, especially when I'm at the controls," she said.

There is a general aviation safety campaign underway in Canada to help make pilots fly safer and better follow the rules. Gervais said the vast majority of his members already do that, but he admits there are still some who don't.

One such pilot died in an accident in Quebec in March. The safety board discovered the pilot's license had not been valid since 1994.

Williams, among others, understands that all recreational pilots need to make sure they are [physically fit to fly, practice flying with an instructor and avoid flying into bad weather](#).

"We're engaging in a ridiculously risky activity, but we're moderating the risks by studying and by practicing and by refresher training," he said.

## **Leading Without A Clear Horizon: What Pilot Training Teaches About Leadership**

Aeronautical decision-making models stress that good judgment [can actually be taught](#)

As technologists, we frequently encounter situations where decisions need to be made, while not all pieces of the puzzle are in place. [We might not see the immediate impact](#), but we know the general heading and the destination. In my relatively short experience in aviation,

I have learned important lessons of breaking down complex problems into simple steps.

I learned to rely on organized summaries, such as checklists. They have led me out unclear or potentially dangerous situations, where I had no one else to rely on.



Recently, I was in the pilot seat during a local night flight. What appeared to be a nearly textbook situation, took me off guard. I dropped an item, leaned to pick it up, pressed on the controls, while doing so. Then, I didn't check back if my instruments were in order. The flight seemed normal. In the first few seconds, as I couldn't anyhow see the horizon, my attention was on the lights that looked like a blended between stars, surface lights, and water reflections. **Suddenly, I noticed I was quickly spiraling down.**

Having enough altitude to my advantage, I was able to quickly recover and get back to level flying.

In aviation, multiple training hours, rigorous procedures are supported by simple, memorable checklist that help pilots take control of situations. I found them to be so relatable, simple and handy that I refer to them in my professional and personal decisions.

**Despite all the advances** in technology, despite the plethora of available information and expertise, hazardous situations still occur due to, just like in tech, **human factors.**

**Here are some of the helpful aeronautical decision-making models** that I personally find useful. They take into account external and internal circumstances, personal attitudes and can help technology leaders.

Aeronautical decision-making models stress that contrary to what may be a widespread belief, good judgment can actually be taught.

**Steps towards good judgments:**

1. Identifying personal attitudes hazardous to safe flight
2. Learning behavior modification techniques
3. Learning how to recognize and cope with stress
4. Developing risk assessment skills
5. Using all resources
6. Evaluating the effectiveness of one's ADM skills

**Making risks decisions:**

1. Accept no unnecessary risk.
2. Make risk decisions at the appropriate level.
3. Accept risk when benefits outweigh dangers (costs).
4. Integrate risk management into planning at all levels.

**How to make decisions. Use DECIDE model:**

- D** Detect the change
- E** Estimate the significance
- C** Choose desired outcome
- I** Identify actions necessary
- D** Do the necessary actions

E Evaluate the action results

**Which factors to consider when making a decision for maneuvers. Use PAVE model:**

P pilot (*you*)

A aircraft (*area of your direct control*)

V environment (*external factors*)

E external pressures (*stress and pressures*)

**How to act under stress. Use 3 P's model:**

P Perceive (circumstances)

P Process (impact on safety)

P Perform (course of action)

<http://www.faa.gov/>

## **Non-profit aviation safety organization Medallion Foundation to close doors**

The Board of Directors of the Medallion Foundation, an [Alaska non-profit aviation safety organization](#), says that due to an decrease in funding from the Federal Aviation Administration it will be closing its doors on Sept. 15 [after 17 years](#). The press release announcing the closure also cites a change of "language that may place the Medallion Foundation in the position of being used as an instrument to take action against air carriers who are voluntarily participating" in its programs.

The board of directors says it met on Aug. 9 to discuss a memorandum of understanding sent to the Medallion Foundation from the FAA.



"It is with deep regret and sadness that the Board of Directors find the funding insufficient to continue operations and will not agree to these terms in the new Memorandum of Understanding," states the press release.

The release writes that it is "unfortunate" that Alaska carriers won't be able to access the safety programs that the foundation provides, such as training classes, simulators, TapRoot accident investigation, tourism safety videos, and maintenance, among other services.

According to its website, the Medallion Foundation was formed "from an infamous legacy of too many aircraft accidents and fatalities in Alaska."

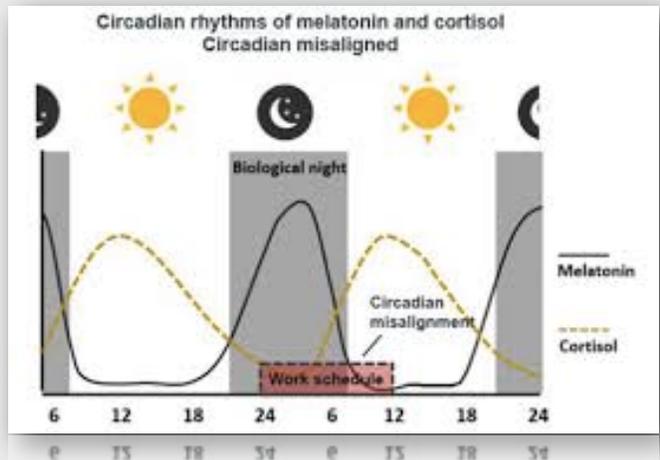
Original appropriations secured by Sen. Ted Stevens allowed it to buy seven flight simulators. The foundation's website cites a CDC study that claims that accidents in commercial air carriers in Alaska declined by 57 percent between 2000 and 2009.

## **Keeping Shift Workers Alert on the Job: New Study Finds How to Predict a Person's Body Clock**

The researchers tracked circadian phase, light exposure and activity levels in 25 nursing and medical staff in a Melbourne hospital intensive care unit, reports The New Daily.

As expected, the timing of when the test subjects were exposed to light and when they were in the dark or dim light **had the greatest impact on when their >**

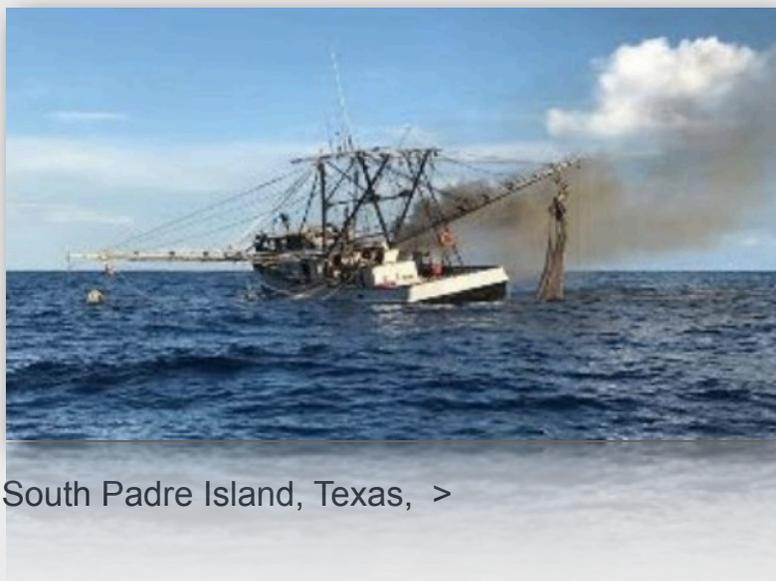
**body clocks** shifted from alertness to tuning out and drifting toward rest. The net result was that, for the first time, the mathematical model – built over a long period of time by a succession of researchers – could be generalized to estimate the timing of the body clock in shift-working staff.



[Get the full story at thenewdaily.com.au](http://thenewdaily.com.au)

## **NTSB: "Manageable" Leaking Lube Oil Caused Fire**

The U.S. National Transportation Safety Board (NTSB) has released its investigation report into the fire and subsequent sinking of the fishing vessel *Master D*. About 0030 local time on August 31, 2018, the *Master D* was transiting with three crewmembers in the Gulf of Mexico 45 miles southeast of South Padre Island, Texas, >



when a fire in the engine room was discovered. After unsuccessfully trying to extinguish the fire, the crew abandoned the vessel without injury.

The fire continued to burn until the vessel sank the next day. An oil sheen approximately 400 yards by one mile was visible in the water after the sinking. The estimated property damage exceeded \$162,000.

The NTSB determined that the probable cause of the fire aboard the vessel was [leaking lube oil from the diesel generator](#) that contacted a hot engine surface and ignited. Contributing to the eventual sinking was the failure of fire-damaged nonmetallic hoses connected to through-hull fittings below the waterline.

The fuel oil supply valves for the main diesel engine and the generator were located in the engine room. After the fire was discovered, the valves could not be reached by the crew due to the intensity of the fire and smoke. The burning vessel's diesel engine continued to operate for about an hour after the crew departed.

[Prior to the accident voyage, the captain had notified the company](#) that there was a lubricating oil leak on a seal on the vessel's single diesel generator. The company contracted a mechanic to repair the seal while the vessel was at the dock. However, prior to departure, the captain noticed that the oil leak continued, [but he thought the issue was manageable.](#)

<https://www.maritime-executive.com/article/photos-fishing-vessel-burns-sinks-off-brownsville>