



UNITED STATES COAST GUARD

REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES SURROUNDING THE INCIDENT INVOLVING SPV SKY SCREAMER - DEATH

ON 09/05/2010



MISLE ACTIVITY NUMBER: 3844346
ORIGINATING UNIT: SECTOR ST PETERSBURG
MISLE ACTIVITY OWNER: SECTOR ST PETERSBURG
MISLE ACTIVITY CONTROLLER: SECTOR ST PETERSBURG
MISLE CASE NUMBER: 520565

U.S. Department of
Homeland Security

United States
Coast Guard



Commandant
United States Coast Guard

US Coast Guard Stop 7501
2703 Martin Luther King Jr. Ave. SE
Washington, DC 20593-7501
Staff Symbol: CG-INV
Phone: (202) 372-1032
E-mail: CG-INV1@uscg.mil

16732/IIA #3844346
17 June 2022

**LOSS OF LIFE OCCURRING ON THE SMALL PASSENGER
VESSEL SKY SCREAMER WHILE CONDUCTING PARASAIL OPERATIONS IN
THE GULF OF MEXICO NEAR CLEARWATER BEACH, FLORIDA
ON SEPTEMBER 05, 2010**

ACTION BY THE COMMANDANT

The record and the report of the investigation convened for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, conclusions, and recommendations are approved subject to the following comments. This marine casualty investigation is closed.

ACTION ON RECOMMENDATIONS

Recommendation 1: It is recommended that the Commandant of the Coast Guard, along with parasail industry professionals, conduct a review of best safety practices and operating standards published by parasail safety organizations to create a mutually agreed upon set of guidelines for parasail operators. It is recommended that the consolidated operational guidelines be incorporated into federal regulations.

Recommendation 2: It is recommended that the Commandant of the Coast Guard immediately publish a marine safety alert for dissemination to all parasail operators to address the importance of: proper towline maintenance/replacement, inspection of hydraulic components, monitoring of short and long range weather conditions while passengers are in flight and conducting a preflight passenger safety brief (to include procedures to disconnect from parasail assembly). It is also recommended that this marine safety alert stress the need to adopt and follow operating standards published by a parasail safety organization.

Recommendation 3: It is recommended that the Commandant of the Coast Guard, in conjunction with the Cordage Institute, initiate a study to determine the effect of dynamic forces placed on a towline engaged in parasailing operations. The results of this study should be utilized to create guidelines to address towline selection criteria, line inspection, line maintenance (to include trimming of bitter end) and criteria to remove line from service. Furthermore, it is recommended that this study research an alternative connection to a bowline knot to secure the towline to the parasail without degrading the line's breaking strength.

Recommendation 4: It is recommended that the Commandant of the Coast Guard immediately conduct an outreach effort to parasailing operators recommending immediate inspection of

towlines for potential damage. This outreach effort should stress the importance to strict adherence to recommended line maintenance practices established by parasail safety organizations.

Recommendation 5: It is recommended that the Commandant of the Coast Guard consult with manufacturers of hydraulic motors commonly used in the parasail industry to study effects of dynamic forces applied to hydraulic motors used as a component of a parasail winch assembly. Field tests conducted by the NTSB utilized a dynamometer to measure the tension capacity of a parasail winch; the analyzed data, although approximate, suggest operating a parasail in high wind conditions can generate sufficient shear stress to cause a splined drive to fail. It is also recommended that the plausibility of internal inspection of the hydraulic motor (to include nondestructive testing) and criteria to determine the life expectancy of a motor (age, cycle time, etc.) be discussed with manufacturers of hydraulic motors.

Recommendation 6: It is recommended that the Commandant of the Coast Guard conduct a study of all parasail vessels in service to determine the age of hydraulic motors on winch assemblies. Pending the results of recommendation #5, it is recommended that guidance be drafted to propose replacement of motors that have potentially exceeded their life expectancy.

Recommendation 7: It is recommended that the Commandant of the Coast Guard review the stability criteria for passenger vessels engaging in parasailing activities and determine if the towline pull criterion for towing vessels (46 CFR 173.090) can/should be applied to reduce the risk of a loss of stability.

Recommendation 8: It is recommended that the Commandant of the Coast Guard make use of marine inspectors to educate parasail operators of the implications weather has on stability. This outreach should stress stability is calculated without considering influences from parasail operations and the best way to avoid the negative implications of parasail operations is to be cognizant of weather conditions and operate within the recommended guidelines of parasail industry professionals.

Recommendation 9: It is recommended that the Commandant of the Coast Guard review licensing criteria for parasail operators and crew to determine if additional licensing endorsements should be applied. By its nature, parasailing requires crews to perform tasks not associated with the operation of a traditional passenger vessel. Through education and testing of proficiency, Coast Guard credentialed mariners can gain a better understanding of the dynamics of a parasail vessel.

Recommendation 10: It is recommended that the Commandant of the Coast Guard work with the parasail industry and equipment manufacturers to develop redundant systems to arrest a free spooling winch.

Recommendation 11: It is recommended that the contents of this investigation be given widest dissemination among national parasailing organizations, operators and OCMI zones with parasail operators.

Recommendation 12: It is recommended that the Commandant of the Coast Guard incorporate the findings of this investigation, as well as those from other parasailing casualties, into a formal course module for incorporation into the Investigating Officer and Marine Inspection course curriculum at Training Center Yorktown.

Recommendation 13: It is recommended that the Commandant of the Coast Guard enact regulations to inspect all parasail vessels that carry at least one passenger for hire.

Recommendation 14: It is recommended that the Commandant of the Coast Guard require parasail operators to provide notice to passengers that although parasail vessels are regulated by the Coast Guard, the Coast Guard does not regulate or inspect associated parasailing equipment and flight operations.

Recommendations 1-14: I concur with the intent of these recommendations. The Coast Guard currently lacks regulatory authority to compel compliance with regard to parasailing operations, equipment, or parasail specific endorsements for merchant mariner licensing. However, since 2009, the Coast Guard has shepherded the development of consensus standards with Industry stakeholders including the Water Sports Industry Association (WSIA).

In January 2012, the Coast Guard requested that stakeholders and WSIA develop voluntary standards for the parasailing industry using the American Society for Testing and Materials (ASTM) consensus standards process. A subcommittee was formally established in the fall of 2012, and the first ASTM standards were published in April 2013.

The ASTM "Standard Practices for Parasailing" continue to be reviewed and have undergone multiple revisions over the past nine years, the most recent version being F3099-19. The parasail industry has taken extensive action towards improving operational safety. Key elements of the standard are: Weather Monitoring and Limits, Equipment, Towline Care, Operations, Crew Requirements, Emergency Procedures, and Patron Responsibility. The Coast Guard continues to monitor the industry's implementation of the ASTM standards and evaluate their effectiveness. This is completed through Coast Guard presence at annual parasailing conferences and engagement with the Water Sports Industry Association (WSIA) and by periodically providing casualty data to measure ASTM standard effectiveness.

Additionally, since 2009, the Coast Guard has issued multiple Safety Alerts and Marine Safety Information Bulletins (MSIBs) to the public, which are specific to the parasailing industry and include the following:

- 2009: 06-09 Safety Alert 'Parasailing Incidents'
- 2011: 05-11 Safety Alert 'Parasailing: Know your Ropes'

- 2012: The Commandant sent message (R 191851Z Jan 12) regarding commercial parasailing vessel safety and included the "Commercial Parasailing Vessel Safety Guidance," which prescribes how outreach to parasail operators should be conducted by Coast Guard units.
- 2013: 07-13 Safety Alert 'Parasailing Operations – Know Your Ropes (2)'
- 2014: 05-14 Safety Alert 'Overheating of Parasailing Vessel Hydraulic System'
- 2015: MSIB 003-15 'Parasailing - Flight Safety and Rules'
- 2015: 07-15 Safety Alert 'Prevent Parasail Accidents: Follow ASTM Standards and Follow Manufacturer Instructions!'
- 2018: 12-18 Safety Alert 'Hazards of Parasail and Watersport Passenger Transfers'
- 2019: MSIB 002-19 'Parasailing - Navigation Rules and Flight Safety'

A hazardous condition is any condition that may adversely affect the safety of any vessel, bridge, structure, or shore area or the environmental quality of any port, harbor, or navigable waterway of the United States. In July 2015, the U.S. Coast Guard issued Navigation and Vessel Inspection Circular (NVIC) 1-15, "TITLE 46, CODE OF FEDERAL REGULATIONS (CFR), PART 4 MARINE CASUALTY REPORTING PROCEDURES GUIDE WITH ASSOCIATED STANDARD INTERPRETATIONS." NVIC 1-15 clarifies that parasailing accidents not reaching reportable marine casualty thresholds in 46 CFR § 4.05-1 would still constitute a hazardous condition as defined in 33 CFR 160.202 and meet the subsequent reporting requirement of hazardous conditions as defined in 33 CFR §160.216.

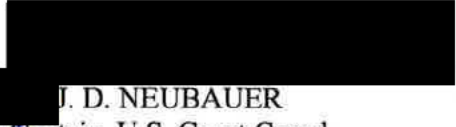
In 2015, U.S. Coast Guard Training Center Yorktown added a parasail casualty scenario to the Investigating Officer Course curriculum. This scenario offers Coast Guard Investigators the opportunity to consider the unique investigation considerations associated with parasail operations.

Since this incident occurred, parasailing fatalities and injuries have declined. The Coast Guard will continue to monitor parasail safety and encourage the combined efforts of stakeholders to improve safety.

Through safety initiatives in public education and outreach, established ASTM standards, and continued partnership with WSIA and ASTM representatives, it is clear that the intent of these recommendations has been addressed as is evidenced through the downward trends in casualties. The closure of this case will allow the Coast Guard to share it and any third party safety recommendations with our parasailing industry partners to further strengthen safety measures within the parasailing industry.

This report, along with similar parasailing cases, will be posted and available to the public on the DCO website here:

<https://www.dco.uscg.mil/Our-Organization/Assistant-Commandant-for-Prevention-Policy-CG-5P/Inspections-Compliance-CG-5PC-/Office-of-Investigations-Casualty-Analysis/Marine-Casualty-Reports/>.


J. D. NEUBAUER
Captain, U.S. Coast Guard
Acting Director of Inspections and Compliance

U.S. Department of
Homeland Security

United States
Coast Guard



Commander
United States Coast Guard
Sector St. Petersburg

155 Columbia Drive
Tampa, FL 33606
Phone: (813) 228-2191
Fax: (813) 228-2399

16732
December 30, 2011

MEMORANDUM

From: [REDACTED]
Investigating Officer

To: S. L. Dickinson, CAPT
CG Sector Saint Petersburg

Thru: P.S. Kelly, CDR
CG Sector Saint Petersburg (sp)

Subj: SKY SCREAMER PARASAILING ACCIDENT WITH LOSS OF LIFE, GULF OF MEXICO, FLORIDA, ON SEPTEMBER 5, 2010

Ref: (a) Title 46 United States Code, Chapter 63
(b) Title 46 Code of Federal Regulations, Part 4
(c) USCG Marine Safety Manual Volume V, COMDTINST M16000.10A

Preliminary Statement:

On September 5, 2010, an informal investigation was initiated into the parasail casualty and subsequent loss of life onboard the small passenger vessel SKY SCREAMER (O.N. 1059195). With assistance from the National Transportation Safety Board (NTSB) and Mr. [REDACTED] from Coast Guard Headquarters (CG-5451), facts were gathered and a complete analysis conducted to draw conclusions in accordance with the above references. All times contained within this Report of Investigation are approximate unless otherwise noted and referenced in local time. All evidence, correspondence, and testimonies gathered during the investigation and used to create this report are included in the Coast Guard's electronic database (MISLE) incident investigation activity 3844346.

Executive Summary:

On September 5, 2010, at approximately 1425, the SKY SCREAMER, with six passengers for hire and two crew, departed berth from Clearwater Marina to parasail in the Gulf of Mexico. The SKY SCREAMER is one of three parasail vessels owned and operated by Sky Screamer Parasail, a conglomeration of two "S" corporations¹. The master proceeded through Clearwater Pass to approximately ¾ to 1 nautical mile offshore of Clearwater Beach. Skies were overcast, wind direction was 300° true at 7 knots gusting to 8 knots and the air temperature was 83° Fahrenheit.

Once the vessel arrived at the location to commence parasail rides, the deckhand assisted the first pair of passengers in donning parasail harnesses and clipped the passengers into the parasail

¹ Nut'in Fancy Fishin, Inc. owns SKY SCREAMER and SKY SCRAPER. Sky's the Limit Watersports, Inc. owns SERENITY. Corporate structure information obtained from the Florida Department of State Division of Corporations lists Mr. [REDACTED] and Mr. [REDACTED] as officers for both corporations.

apparatus, in preparation for a tandem flight. The master reeled out approximately 800 feet of line and towed the first pair of passengers in flight for approximately 10 minutes. After the first pair of passengers were safely recovered, the second pair of passengers were assisted into their parasail harnesses, clipped into the parasail apparatus and placed into flight. The master reeled out approximately 800 feet of line and towed the second pair of passengers for approximately 10 minutes. Near the end of the second flight, the passengers were lowered and “dipped”² into the water before the master commenced reeling the passengers aboard SKY SCREAMER. The master announced to the remaining passengers that he would be unable to fly them because of incoming weather.

The deckhand proceeded to the aft flight platform and prepared to retrieve the aloft passengers. The wind rapidly increased to 10 knots sustained with gusts in excess of 25 knots moments after the master commenced reeling in the passengers. SKY SCREAMER subsequently lost forward momentum and was pulled astern due to the increased strain on the parasail. The master increased the vessel’s RPM’s to hold position, continued to work the winch to retrieve the passengers and radioed his office to request an additional parasail vessel to render assistance.

Once the aloft passengers were within approximately 75 feet of SKY SCREAMER, the winch lost the capacity to further reel in, presumably due to excessive wind strain on the parasail. The vessel master continued to increase engine RPM in order to increase hydraulic pressure to the winch to further reel the passengers aboard the SKY SCREAMER. The attempts to reel the passengers onboard the SKY SCREAMER were unsuccessful; within moments, the master felt the winch surge and the parasail towline uncontrollably free spooled. The entire length of the towline spooled out and rapidly became taught resulting in the vessel heeling approximately 90° to starboard. As the vessel heeled, the deckhand fell overboard and the passengers were thrown to starboard. The towline subsequently parted under the increased strain; the two aloft passengers were carried away from the vessel and descended into the Gulf of Mexico. The SERENITY, which secured operations in order to return to berth minutes before SKY SCREAMER became in extremis, was mid-way through Clearwater Pass. SERENITY received orders from the Sky Screamer Parasail office to alter course to render assistance.

As soon as the aloft parasail passengers entered the water, the still inflated parasail began to pull them backwards towards Clearwater Beach. One passenger was able to climb out of the parasail harness while being dragged through the surf zone. The second passenger was not able to climb out of the harness and was dragged onshore and across Clearwater Beach striking a wooden volleyball post. The injured passenger was transported to Bayfront Medical center and passed away one week later.

² Dipping is the procedure of reducing vessel speed to eliminate lift to the parasail resulting in the passengers slowly descending into the water. Moments before the passengers contact the water, the vessel operator accelerates to increase lift and the parasail passengers legs “dip” into the water.



Figure 1: SPV SKY SCREAMER on trailer at FWCC impound yard.

Vessel Data:

SKY SCREAMER	
Official Number	1059195
Hailing Port	Clearwater, Florida
Service	Commercial
Builder	Commercial Water Sports, Inc.
Year Built	1997
Hull Material	Fiberglass
Gross Tonnage	10
Horsepower	375
Propulsion	Gasoline, inboard/outboard
Length	31 feet
Owner	Nut'in Fancy Fishin, Incorporated
Operator	Mr. [REDACTED]
Inspection Subchapter	46 CFR 175 (Subchapter T)

Personnel Data:

Name	Age	Position	Status
██████████	██	Vessel Master	At risk, not injured
██████████	██	Crew	At risk, injured
Alejandra W. White	27	Passenger	Deceased
██████████	██	Passenger	At risk, injured
██████████	██	Passenger	At risk, injured
██████████	██	Passenger	At risk, not injured
██████████	██	Passenger	At risk, not injured
██████████	██	Passenger	At risk, injured

Findings of Fact:

1. Sky Screamer Parasail operates out of Clearwater Beach, Florida. Mr. ██████████ and his brother ██████████ oversee the day-to-day operation of the business; both are licensed merchant mariners endorsed to operate as master of steam or motor vessels of not more than 100 gross registered tons upon near coastal waters. Mr. ██████████ operates the SKY SCREAMER, Mr. ██████████ makes passenger reservations and monitors and relays weather data to the companies parasail vessels throughout the day. Mr. ██████████ utilizes an internet connection in the ticket booth to monitor various sources of weather information to determine if conditions are safe for parasailing operations. The SKY SCREAMER is a 31-foot, U.S. documented, Coast Guard inspected, small passenger vessel inspected under 46 CFR Subchapter T – Small Passenger Vessels Under 100 Gross Tons. The vessel was designed and built in 1997 by Commercial Water Sports (CWS)³ specifically for parasailing. The vessel is powered by a single inboard/outboard Mercruiser 496 cubic inch, 375 horsepower engine and is constructed from fiberglass. The engine, along with the hydraulic system and towline drum, is located in the aft section of the vessel and can be accessed through a hatch on the passenger landing platform. Passengers are placed into and retrieved from flight on the landing platform. The parasail towline spools off a hydraulically controlled drum and passes through the tow post located along the vessel’s centerline forward of the engine room compartment.

³ The SKY SCREAMER was designed and constructed by CWS which was originally based in Lake Havasu, Arizona. CWS ceased business operations and sold all assets including vessel plans, molds and manufacturing equipment. Although not corporately related, the purchaser kept the CWS name and started manufacturing parasail vessels in Cape May, New Jersey. The SKY SCREAMER was built in Lake Havasu, Arizona, in 1997 and the hull design was discontinued before CWS assets were sold.



Figure 2: SKY SCREAMER landing platform and tow post.

2. Before placing passengers into flight, the vessel operator activates a hydraulic pump by engaging a magnetic clutch from a switch on the operator's console. The winch, which controls the pay in/out of the towline, is controlled by a lever adjacent to the throttle on the helm.

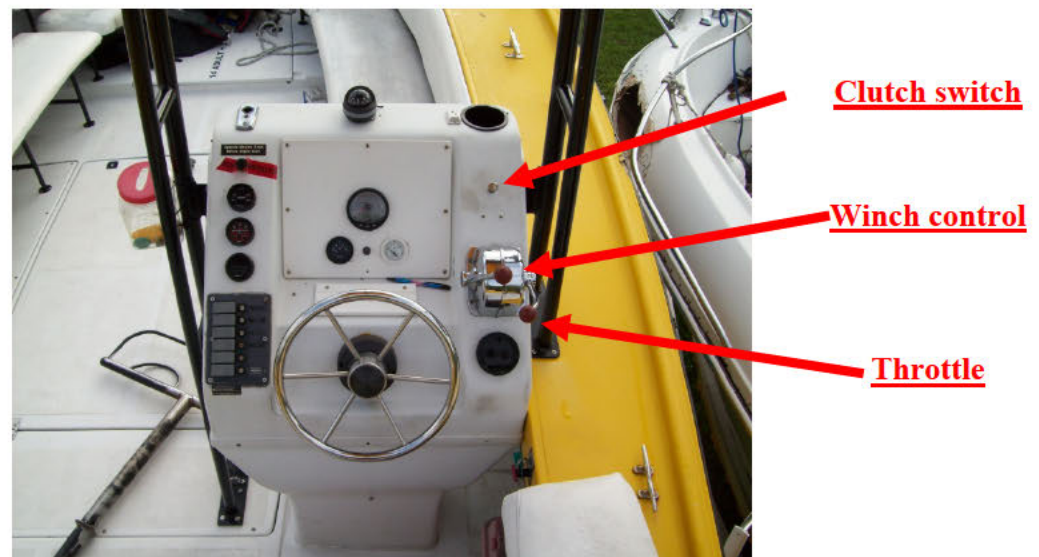


Figure 3: SKY SCREAMER operator console.

3. The hydraulic winch assembly for the vessel is made up of several commercially available components attached to a custom made winch drum. There are no industry standards or

regulations governing the design, operating parameters, maintenance or inspection of parasail winch or hydraulic components. The winch drum is made from aluminum and is designed to hold approximately 1000 feet of 5/16 inch towline. The winch drum is driven by a hydraulic motor manufactured by Char-Lynn, a division of Eaton Hydraulics. Directional and speed control is achieved by a hydraulic directional control valve which connects by cable linkage to a hand operated control on the operator's console adjacent to the throttle. The Char-Lynn hydraulic motor attaches to a multiple-disc brake manufactured by Mico and then to the winch drum. The winch drum, hydraulic motor and brake are presumably original manufacturer equipment installed by CWS in Lake Havasu, Arizona. Hydraulic pressure is supplied by a Delta Q axial piston pump. The hydraulic pump receives power from a power take-off (PTO) unit from the vessel's engine and is engaged by an electric clutch; the electric clutch is activated from a switch on the vessels helm. The towline travels from the winch, through a chain driven levelwinder that evenly lays the towline across the drum, vertically through the tow post passing through the deck of the landing platform.

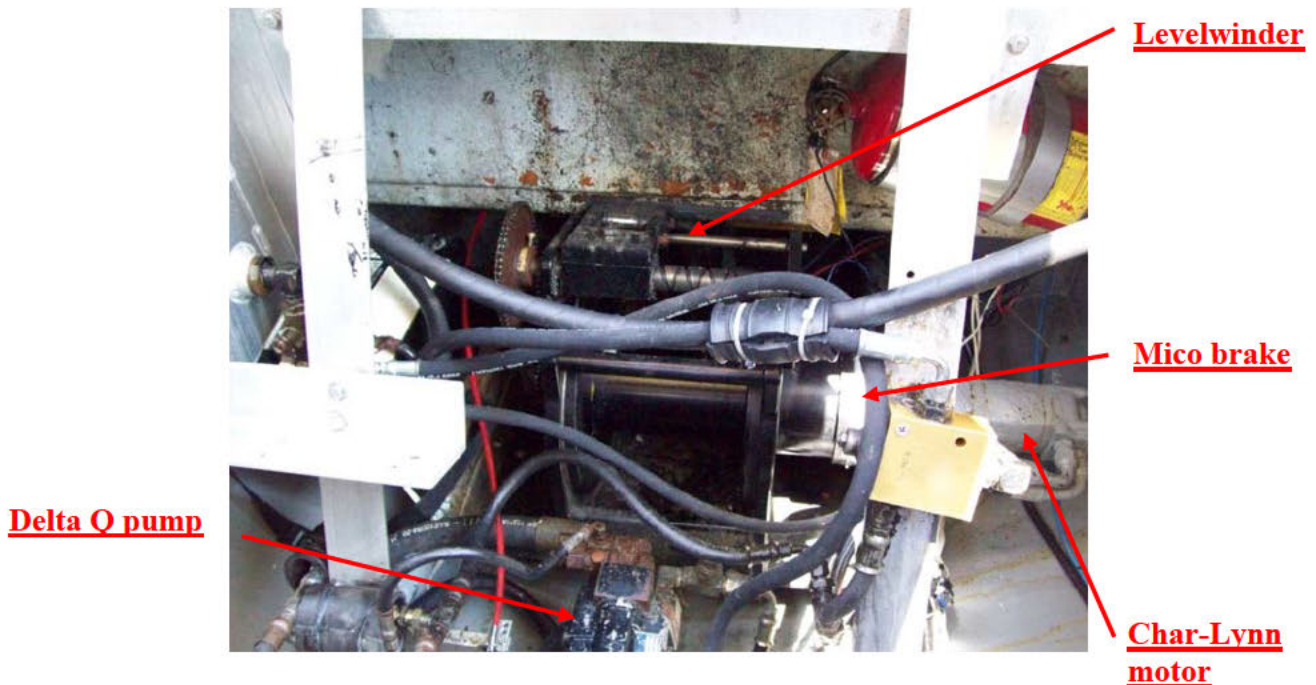


Figure 4: SKY SCREAMER hydraulic winch assembly.

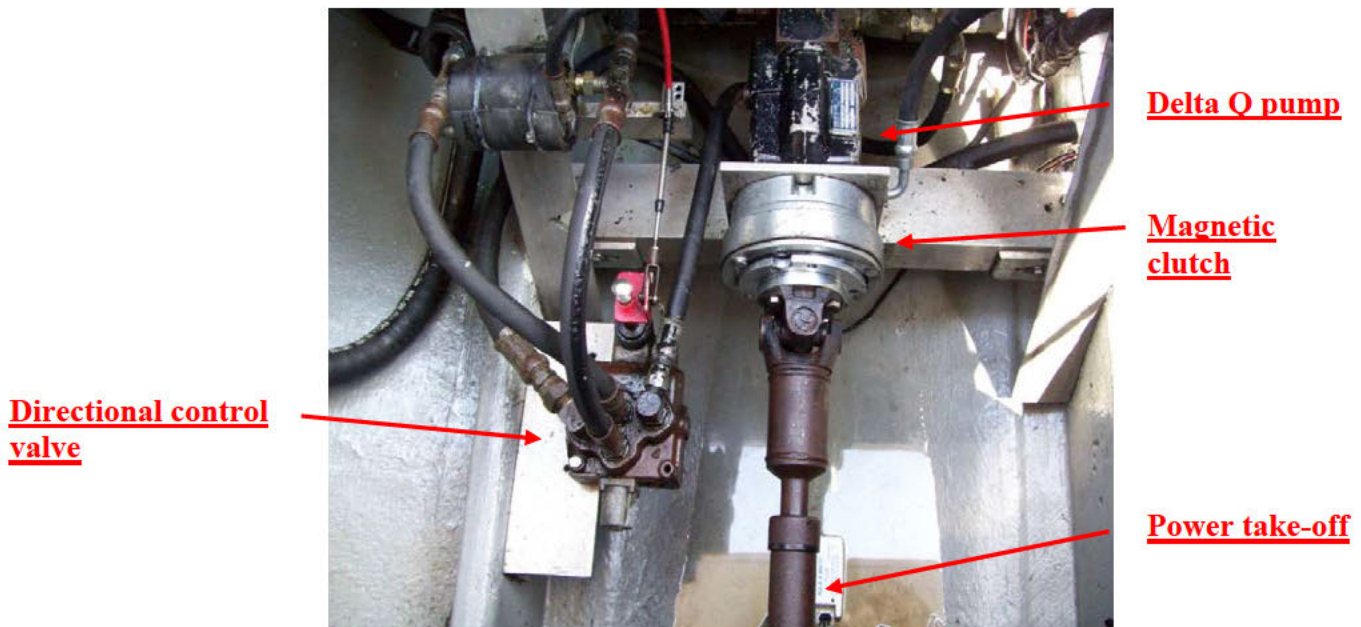


Figure 5: SKY SCREAMER hydraulic pump and power take-off.

4. The parasail used in the casualty was designed and manufactured by Custom Chutes, Incorporated; it is marketed under the name XXtreme parasail. Custom Chutes manufactures several different sizes of parasails with varying wind speed and passenger weight limitations. The involved parasail was identified by a Custom Chutes manufacturer label as a 42 foot parasail. It was manufactured in June, 2009, serial number 06090956, and is designed to operate in winds not greater than 12 m.p.h. with a passenger weight load between 180 and 600 pounds. The parasail consists of 16 pie shaped sections that are commonly referred to as gores; each gore is made up of 4 individual panels. 2 stabilizer panels are located on each side of the parasail; in total, a parasail is made up of 72 individual panels. Lifting slots (located on the rear section of the parasail) and turn slots (located on the sides of the parasail) provide lift and steering stability, respectively. The parasail is constructed from 1.3 ounce rip stop nylon fabric coated with silicon or polyurethane. Fabric segments are sewn together with 1.5 inch preshrunk nylon tape on a flat seam. The yoke and riser assembly are constructed from three layers of two-inch polyester webbing and are connected to the parasail by 16, 7/32 inch polyester shroud lines. The parasail towline is affixed to the yoke with a bowline knot.

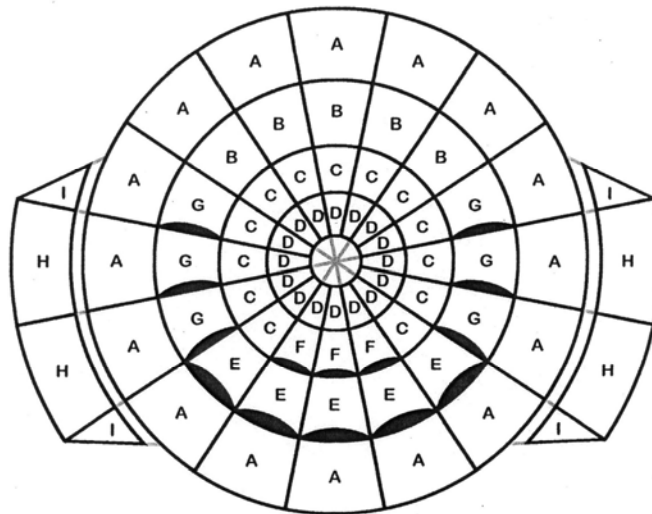


Figure 6: 16 gore parasail.

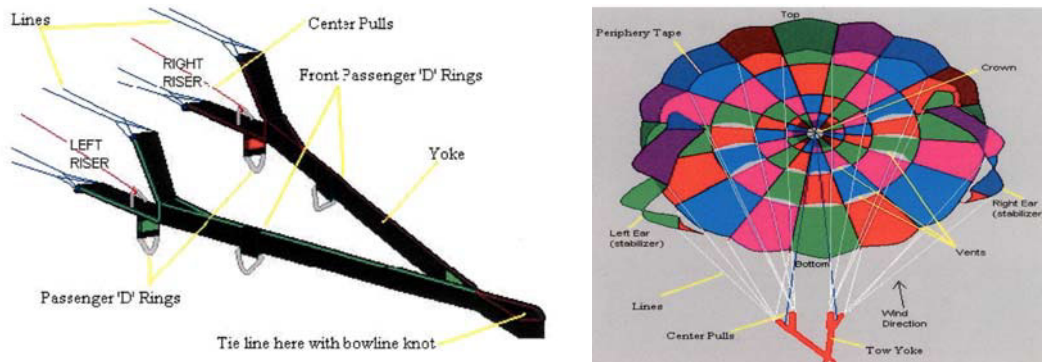


Figure 7: Parasail harness and assembly.

5. The multiflyer bar, designed and constructed by Custom Chutes, connects the passenger harnesses to the parasail riser; it can accommodate one to three passengers. The bar is constructed from aluminum and uses metal locking connections to connect to "D" rings on the parasail riser. Passenger harnesses are suspended under the multiflyer bar with two inch webbing and are connected by carabiners to "D" rings.



Figure 8: Multiflyer bar.

6. The harness, designed and constructed by Custom Chutes, is constructed from polyester webbing with a padded seat and backrest. Passengers are secured in the harness at the waist with a strap and the harness connects to the multiflyer bar with two stainless steel carabineers. The harness comes in several sizes to accommodate different body shapes.

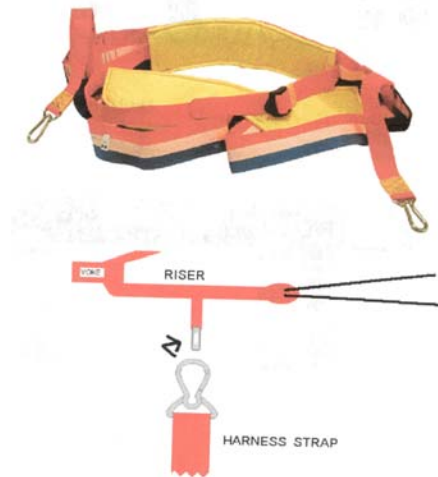


Figure 9: Harness assembly

7. The towline used onboard the SKY SCREAMER was a 5/16 inch diameter 12 strand high modulus polyethylene (HMPE) braided rope purchased from Custom Chutes⁴ on February 8, 2010. The line is commonly referred to as Dyneema and is known for exceptional strength to weight ratio. Parasail operators with smaller winch drums prefer the line because a larger diameter line rope would take up more space on the drum significantly limiting passenger altitude. The line offers exceptional flexibility and is wear resistant; however, it is susceptible to damage from the effects of shock loading. Physical line test reports provided by Pelican Rope Works state the line's average breaking strength of 13,200 pounds. Although there are no service records to substantiate his claim, Mr. [REDACTED] estimates the towline was installed on SKY SCREAMER within a few weeks after it was purchased.

8. On February 8, 2010, marine inspectors from Sector Saint Pete conducted an annual inspection on SKY SCREAMER, zero deficiencies were noted and the vessel was issued a Certificate of Inspection (COI). The COI authorized the vessel to carry 12 passengers with a crew compliment of one master and one deckhand. The vessel is certificated to operate on Lakes, Bays and Sounds, plus Limited Coastwise on the Gulf of Mexico not more than three miles from land and not more than 20 miles from a harbor of safe refuge. Although there are no federal regulations governing the inspection of the vessel's winch and associated parasail equipment, marine inspectors visually examined the winch assembly, hydraulic hoses and tow post; the hydraulic system was not engaged. Marine inspectors did not observe visual indicators that lead them to believe the parasail system would not function as intended or adversely affect

⁴ Custom Chutes purchases Dyneema rope from Pelican Rope Works for resale.

the vessel's seaworthiness. All hydraulic hoses appeared to be in good working order and were not leaking, the winch assembly, and associated gear (magnetic clutch, hydraulic cooler, directional control valve, and counter balance) did not present any signs that parasail system would not function as designed. The vessel was found to be fit for service as an inspected passenger vessel under 46 CFR Subchapter T – Small Passenger Vessel Under 100 Gross Tons and subsequently issued a Certificate of Inspection.

9. The Professional Association of Parasail Operators (PAPO) is a self-regulating organization comprised of parasail operators and industry experts; members must agree to meet PAPO requirements and abide by the organization's operational guidelines. PAPO members may qualify for reduced insurance premiums, preferred equipment pricing from sponsoring suppliers, and have access to safety and marketing literature. A condition of membership is adherence to the organization's Operating Standards and Guidelines (OSAG); PAPO does not inspect or audit signatory members to verify compliance with OSAG requirements. At the time of the casualty, PAPO's web page listed Nut'in Fancy Fishin and [REDACTED] as "active" members; their memberships were changed to "inactive" on January 1, 2011. The OSAG is divided into six sections consisting of: General Rules and Regulations, Operating Conditions, Commercial Vessels, Parasailing Equipment, Safety Equipment Requirements, and Crew Personnel Requirements. PAPO requires members to strictly adhere to the OSAG while engaged in commercial parasailing operations. Adherence includes following every section of the OSAG as well as maintaining written logs to document maintenance, equipment inspections, equipment service dates, and weather observations, as well as passenger safety orientation briefs and release of liability waivers.

10. On the morning of September 5, 2010, Mr. [REDACTED] master of the SKY SCREAMER, conducted a daily check of the vessel's engine fluids, hydraulic hoses and associated parasail equipment including the winch drive assembly, multiflyer bar and parasail towline. He did not observe any leakage from engine or hydraulic components nor did he observe anything out of the ordinary that would lead him to believe the vessel was not fit for service. Although several sections of the OSAG governing daily inspection and maintenance require written documentation, Mr. [REDACTED] did not record the results of his inspection. One task the OSAG requires on a routine basis is trimming of the towline bitter end at a prescribed interval. The towline was not trimmed during this inspection; furthermore, Mr. [REDACTED] stated towline trimming is conducted on an "as-needed" basis, despite PAPO's requirement to trim 2 feet with a maximum period of 7 days or every 400 flights, whichever comes first. Sky Screamer Parasail did not maintain a log to document line trimming and could not remember the exact date the line involved in this casualty was trimmed, or how many flights were conducted with the line.

11. On, September 5, 2010, at 1020, the National Weather Service issued a coastal waters forecast for the waters of Englewood to Tarpon Springs out to 20 nautical miles. The forecast called for winds in the afternoon becoming northwest 5 to 10 knots, seas 2 feet or less, bay and inland waters smooth with isolated thunderstorms in the morning and scattered thunderstorms in the afternoon.

12. On September 5, 2010, at approximately 1410, Mr. [REDACTED] and his fiancée, Ms. Alejandra White, approached the Sky Screamer Parasail ticket booth and inquired about the cost of a parasail ride. Mr. [REDACTED] and Ms. White were told the next ride was scheduled for 1530, however, if more passengers were available they could go sooner. Within minutes, Ms. [REDACTED] and Ms. [REDACTED] approached the ticket booth and inquired about the cost of a parasail ride, followed by Mr. [REDACTED] and Mrs. [REDACTED] bringing the number of confirmed passengers to six. The passengers were told by the ticket booth attendant that they would need to get underway quickly so they could beat the incoming storm. Mr. [REDACTED] purchased his and Ms. White's ticket at 1416, Mrs. [REDACTED] mother of Ms. [REDACTED] and Ms. [REDACTED] purchased [REDACTED] and [REDACTED] tickets at 1419, and Mr. [REDACTED] purchased his and Mrs. [REDACTED] tickets at 1423.⁵ Every passenger signed release of liability before boarding the vessel at 1424. Upon boarding the vessel, Ms. [REDACTED] sat in the most forward seat on the starboard side, her sister [REDACTED] sat directly behind her. Mrs. [REDACTED] sat in the most forward seat on the port side, her husband; Mr. [REDACTED] sat behind her followed by Ms. Alejandra White and Mr. [REDACTED]. Mr. [REDACTED] sat behind the helm, Mr. [REDACTED] stood in the aft section of the passenger compartment and the flight deck.

13. The vessel departed Clearwater marina at approximately 1425, proceeded through Clearwater Pass and into the Gulf of Mexico.⁶



Figure 10: Photo depicting transit route from Clearwater Marina to the Gulf of Mexico

46 CFR 185.506 requires the master of a vessel to ensure that a passenger safety orientation is conducted before getting underway. The passenger safety orientation discusses actions for passengers to take during an emergency, much like a pre-flight passenger brief on a commercial

⁵ Ticket purchase times were verified from times on credit card receipts.

⁶ Underway time was verified from time on photo taken by Mrs. [REDACTED] depicting SKY SCREAMER departing berth.

airplane. The brief includes safety items germane to all passenger vessels, such as: location of emergency exits, stowage locations of life jackets and life jacket donning instructions. The passenger safety orientation does not, nor is it intended to, address safety concerns related to parasail activities. Interviews with passengers confirmed a passenger safety orientation brief was not conducted prior to getting underway or during the vessel's transit into the Gulf of Mexico.

14. In addition to the passenger safety orientation brief required under 46 CFR 185.506, PAPO's OSAG – 13 requires PAPO members to conduct a passenger safety brief prior to departing berth. The briefing shall contain the following information: a description of the activity itself; safety precautions while underway and in flight; safety and life saving equipment locations; warnings and procedures for unexpected events, such as water landings, equipment malfunctions and towline separation and procedure in the event of an emergency onboard the vessel; and the proper use of signals. Additionally, after the brief, passengers shall be provided a question and answer period. Interviews with passengers confirmed a passenger safety orientation brief was not conducted before departing berth or before passengers were placed into flight.

15. The National Oceanic and Atmospheric Administration (NOAA) receives weather observation data from a weather monitoring station located on Pier 60 in Clearwater Beach; this location is less than a half mile away from the Sky Screamer ticket booth. At 1430 winds were from 310 T, at 6.93 m.p.h., gusting to 9.17 m.p.h. Radar images showed an area of storms in the Gulf of Mexico off Clearwater Beach. All referenced wind data contained within this report were obtained from this monitoring station; radar images were obtained from NOAA National Data Center.

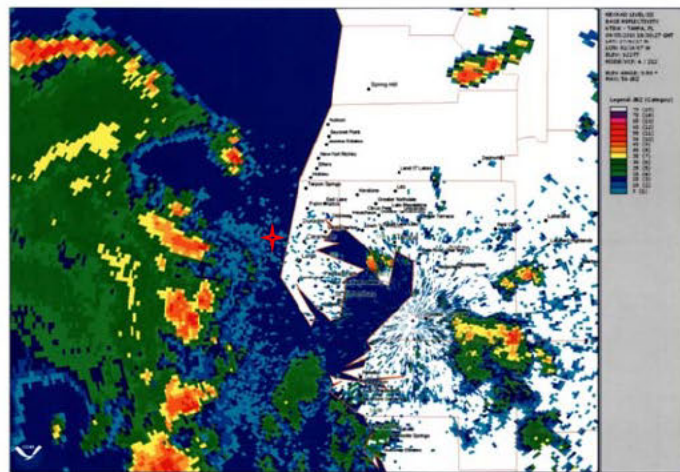


Figure 11: 1430 Radar image; red star denotes approximate location of casualty.

SKY SCREAMER transited through Clearwater Pass at 1435, photos obtained from Ms. Alejandra White's camera captured dark clouds offshore Clearwater Beach. At 1436 winds were from 300 T, at 8.05 m.p.h., gusting to 9.17 m.p.h. Figure 12 is the tip of Sand Key Park located on the southernmost tip of Clearwater Pass.



Figure 12: Southernmost tip of Clearwater Pass overlooking Sand Key Park

At 1439, SKY SCREAMER was $\frac{3}{4}$ to 1 mile offshore Clearwater Beach. Radar images showed the offshore storm was advancing eastward toward Clearwater Beach.

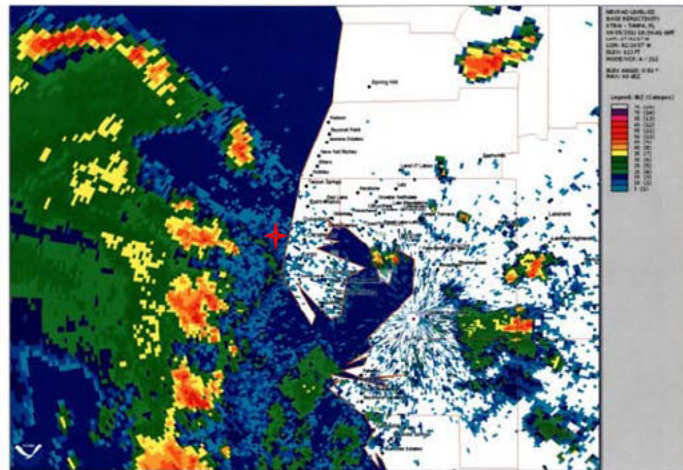


Figure 13: 1439 radar image depicting advancement of offshore storm; red star denotes approximate location of casualty

16. Mr. [REDACTED] assisted [REDACTED] into life jackets and parasail harnesses. Mr. [REDACTED] placed [REDACTED] and [REDACTED] in flight at approximately 1440.⁷ At 1442 winds were from 310 T, at 5.81 m.p.h., gusting to 9.17 m.p.h. The [REDACTED] were in flight for approximately 7 minutes and brought back to the SKY SCREAMER at approximately 1447. During the [REDACTED] flight, Mr. [REDACTED] assisted Mr. [REDACTED] and Ms. White into life

⁷ Time was obtained from photos taken with Ms. White's camera. Unless otherwise referenced, passenger flight times were obtained from photos taken with Ms. White's camera.

jackets, as they were next to be placed into flight. Once back on the vessel, the [REDACTED] removed their life jackets and parasail harness and were seated on the starboard forward seats.

17. At 1448, Mr. [REDACTED] and Ms. White were clipped into the parasail; the vessel master reeled out approximately 800 feet of towline and placed them into flight. Ms. [REDACTED] was seated on the starboard forward seat, her sister, [REDACTED], was seated directly behind her. Mr. [REDACTED] was seated on the aft port seat, his wife Mrs. [REDACTED] was seated in the forward seat. With the offshore storm advancing eastward, winds were from 320 T, at 6.93 m.p.h., gusting to 9.17 m.p.h.



Figure 14: Mr. [REDACTED] and Ms. White placed into flight at 1448

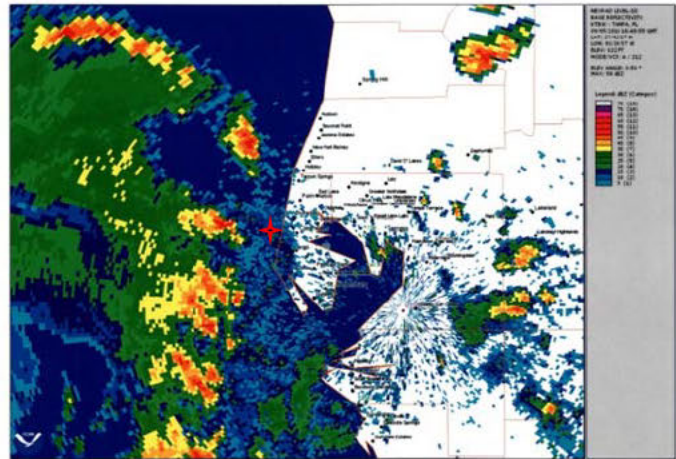


Figure 15: 1448 radar image depicting advancement of offshore storm; red star denotes approximate location of casualty

18. At 1454, as their flight ended, Mr. [REDACTED] and Ms. White were “dipped” into the water before Mr. [REDACTED] commenced to bring the couple back on board the SKY SCREAMER. Figures 16, 17, and 18 are a series of photos depicting Mr. [REDACTED] and Ms. White being “dipped”. At 1454 winds were from 270 T, at 21.92 m.p.h., gusting to 29.97 m.p.h. Mr. [REDACTED] announced the passengers on the SKY SCREAMER that due to the degrading weather conditions, the third pair of passengers would not be permitted to fly and that when the aloft passengers were safely back onboard the vessel they would return to port.



Figure 16: Photo taken at 1453 by onshore witness depicting Mr. [REDACTED] and Ms. White in flight



Figure 17: Photo taken at 1454 by onshore witness of Mr. [REDACTED] and Ms. White being "dipped"



Figure 18: Photo taken at 1455 by Ms. White's camera depicting couple being "dipped"

19. At 1455, after Mr. [REDACTED] and Ms. White were "dipped", Mr. [REDACTED] engaged the vessel's winch to reel in the parasail towline. Figures 19, 20, 21 and 22 were taken from the SKY SCREAMER using Ms. White's camera. This series of photos depicts the final moments of Mr. [REDACTED] and Ms. White's flight as the parasail was making final approach to the SKY SCREAMER.



Figure 19: Photo taken at 1456 by Ms. White's camera



Figure 20: Photo taken at 1456 by Ms. White's camera

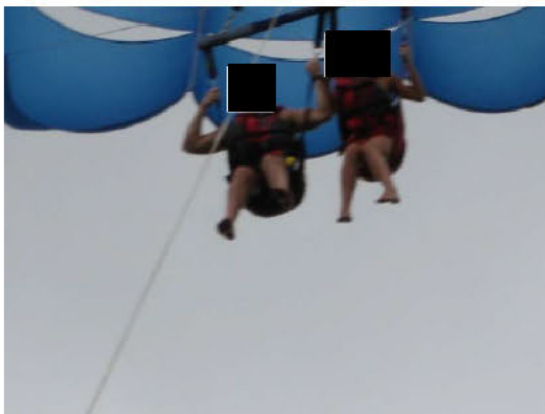


Figure 21: Photo taken at 1457 by Ms. White's camera

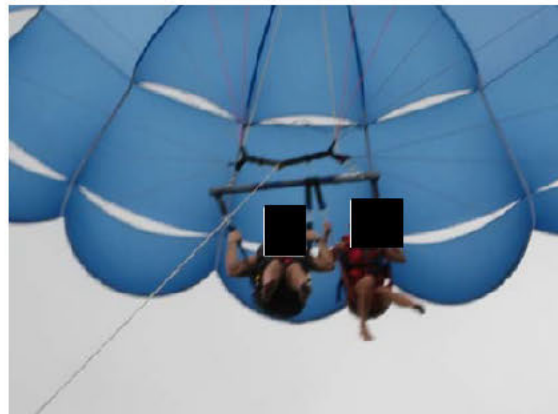


Figure 22: Photo taken at 1457 by Ms. White's camera

20. At 1457, the parasail was buffeted by increasing winds. Mr. [REDACTED] continued to reel the passengers in, once the aloft passengers were within approximately 75 feet of SKY SCREAMER, the winch lost the capacity to further reel in, presumably due to excessive wind strain on the parasail. Mr. [REDACTED] increased engine RPM in order to increase hydraulic pressure to the winch to further reel the passengers aboard the SKY SCREAMER. Due to the increased strain from the parasail, the vessel lost forward motion; further attempts to reel the passengers onboard the SKY SCREAMER were unsuccessful; within moments, the winch surged and the parasail towline uncontrollably free spooled. The entire length of the towline spooled out and rapidly became taut resulting in the vessel heeling approximately 90° to starboard. As the vessel heeled, Mr. [REDACTED] the deckhand, was thrown overboard from the flight platform. The heeling of the vessel caused the passengers to be thrown within the interior of the vessel. Mr. [REDACTED] struck his left shin during the heeling resulting in a 3-inch laceration. Ms. [REDACTED] bruised her feet and ankles; her sister [REDACTED] bruised her inner right thigh when they were tossed within the interior of the vessel. Figure 23 was taken from the

onshore Clearwater Beach and captures the SKY SCREAMER heeled onto the starboard side; the parasail towline is presumably completely payed out.

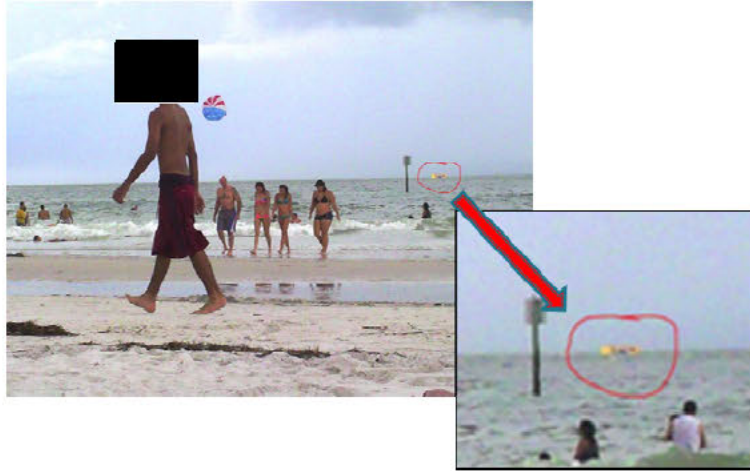


Figure 23: Photo taken at 1457 by onshore witness depicting SKY SCREAMER heeled to starboard (this image has been enhanced to more clearly show heeling of SKY SCREAMER)

21. The towline subsequently parted under the increased strain; Mr. [REDACTED] and Ms. White were carried away from the vessel and descended into the Gulf of Mexico. Mr. [REDACTED] radioed a distress call to the Sky Screamer office and requested assistance. The SERENITY, which was conducting parasailing operations at the South entrance of Clearwater Pass, secured parasailing operations in order to return to berth minutes before SKY SCREAMER became in extremis. During the inbound transit, SERENITY received orders from the Sky Screamer Parasail office to alter course and render assistance. Mr. [REDACTED] SERENITY master, immediately altered course and proceeded to SKY SCREAMER, which was disabled and adrift due to the towline trailing from the stern of the vessel with a man overboard. As soon as Mr. [REDACTED] and Ms. White entered the water, the still inflated parasail began to pull them backwards towards Clearwater Beach. Photos, eye witness accounts, and statements from Mr. [REDACTED] indicate the parasail pulled them at a high rate of speed causing them to plane on their backs while being drug through the water. Mr. [REDACTED] successfully climbed out of the parasail harness while being dragged through the surf zone. Ms. White was not able to climb out of the harness and was subsequently dragged onshore and across Clearwater Beach striking several beach umbrellas, bystanders on the beach and chairs; she eventually struck a wooden volleyball post where the parasail became entangled and subsequently deflated. Figures 24, 25, 26 and 27 depict the parasail moments after the towline parted and the parasail was dragged onshore. Ms. White was treated by responding EMS and transported to Bayfront Medical Center; she succumbed to her injuries on September 11, 2010. 1458 radar images, figure 28, show further onshore advancement of offshore storm, 1500 winds were from 280 T, at 21.92 m.p.h., gusting to 34.44 m.p.h.



Figure 24: Photo taken at 1457 by onshore witness depicting parasail free falling into the Gulf of Mexico after towline parted



Figure 25: Photo taken at 1457 by onshore witness depicting parasail blowing onshore



Figure 26: Photo taken at 1457 by onshore witness depicting blowing onshore



Figure 27: Photo taken at 1458 by onshore witness depicting parasail transiting through surf zone

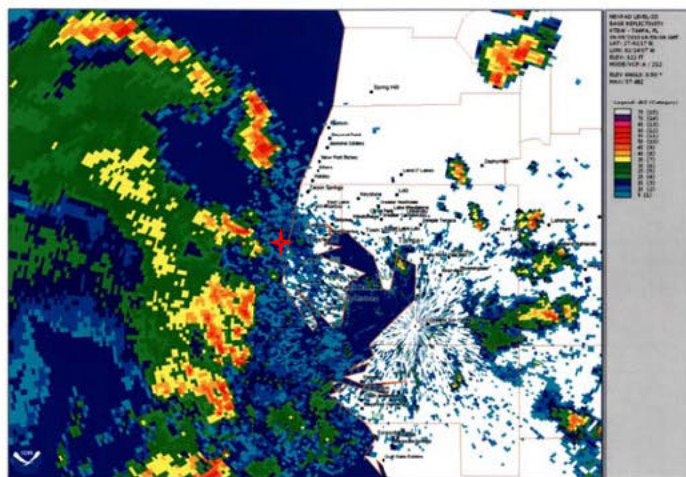


Figure 28: 1458 radar image depicting advancement of offshore storm; red star denotes approximate location of casualty

22. At 1505, SERENITY arrived at SKY SCREAMER's location offshore south of Pier 60, Clearwater Beach, there was no time for SERENITY or SKY SCREAMER to assist the runaway parasail because of the speed at which the wind blew it onshore Clearwater Beach. Upon arriving on scene, SERENITY's crew observed SKY SCREAMER facing northeast, with the parasail towline trailing from the stern. Mr. [REDACTED] was in the water, bleeding from the nose. Mr. [REDACTED] SERENITY deckhand, donned a life jacket and jumped into the water assist Mr. [REDACTED] onto SERENITY. Once onboard SERENITY, Mr. [REDACTED] stated he was experiencing pain in his ribs; Mr. [REDACTED] radioed the Sky Screamer ticket booth that he was immediately departing the casualty location to transport Mr. [REDACTED] back to shore for medical treatment. Mr. [REDACTED] was transferred to SKY SCREAMER to assist passengers and prepare the vessel for transit back to shore. Upon boarding SKY SCREAMER, Mr. [REDACTED] observed the interior of the SKY SCREAMER in disarray with passengers visibly shaken. After retrieving the towline, SKY SCREAMER got underway and proceeded back to Clearwater Marina.

23. Drug and alcohol tests were conducted on Mr. [REDACTED] and Mr. [REDACTED] within regulatory timelines, results were negative.

Analysis:

1. *Winch and associated hydraulic equipment:* The hydraulic system on SKY SCREAMER is driven by a hydraulic pump powered by a power take-off unit from the vessel's engine. The hydraulic pump sends hydraulic pressure to the hydraulic motor and brake assembly. The hydraulic motor couples with the brake by a splined drive; the brake's output shaft drives the winch drum. The brake is released when the vessel's operator engages the winch motor by a lever on the helm to pay in or out towline from the drum. When the lever is engaged, hydraulic pressure is supplied to drive the winch motor and the brake is released. In this environment, the entire strain from a parasail in flight is transferred to the hydraulic motor. Conversely, when the operator disengages the winch motor to cease paying in or out towline from the drum, hydraulic pressure is removed and the brake activates. In this environment, the entire strain from a parasail in flight is transferred to the brake. Figure 29 is a schematic depicting the hydraulic system.

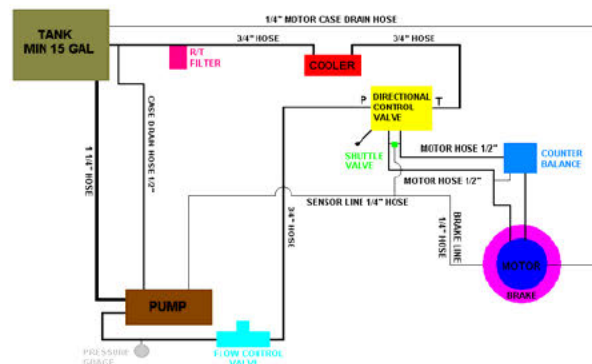


Figure 29: SKY SCREAMER hydraulic system schematic

When the casualty occurred, Mr. [REDACTED] had the drum winch engaged because he was actively retrieving passengers; therefore, the brake was disengaged. With the brake disengaged, all strain from the aloft parasail was placed onto the hydraulic motor. Mr. [REDACTED] statement, along with statements from other witnesses, confirms an uncontrolled free spooling of the winch before the parasail towline became taut and parted. Examination of the vessel upon returning to port confirmed the entire length of the towline was spooled off the winch drum with the bitter end of the towline remaining attached to the drum. External examination of the winch and associated hydraulic assembly revealed no outward indications of a mechanical failure; all housings were intact, the hydraulic fluid reservoir was full and the hydraulic hoses intact.

The winch drum assembly (drum, brake, hydraulic motor and level winder assembly) were removed from the vessel for dismantling and further examination. As the components were dismantled, all splines, set keys and union between the motor, brake and drum were observed intact and did not display signs of failure that would have contributed to an uncontrolled free spool. The Char-Lynn hydraulic motor was further dismantled for internal examination. The manufacturer's identification plate was not discernable due to an accumulation of paint. Figure 30 is a schematic depicting the internal components of the Char-Lynn hydraulic motor.

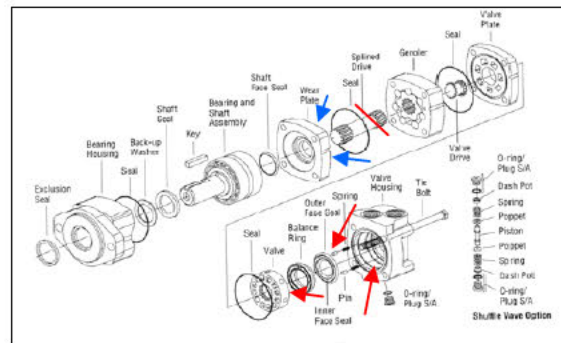


Figure 30: Char-Lynn hydraulic motor

Metal fragments were immediately observed in the valve housing, the first section of the motor removed (figure 31). Metal fragments were further observed on the outer face seal and valve assembly (figure 32). These two sections are annotated in figure 30 with red arrows. As disassembly progressed, the geroler was lifted off revealing a fracture on the splined drive that drives the motor's output shaft (figures 33 and 34). The splined drive was completely fractured in two pieces; the fractured section of the spline remained lodged within the geroler assembly (figures 33 and 34). The fractured splined drive is represented in figure 30 with a red line. The fractured section of the splined drive was removed from the geroler assembly; the remaining section of the fractured splined drive remained lodged within the bearing housing assembly (figure 35). Both sections of the splined drive were sent to the NTSB for forensic analysis.



Figure 31: Metal fragments within valve housing



Figure 32: Metal fragments on outer face seal and valve assembly



Figure 33: Fractured splined drive stuck inside of geroler assembly



Figure 34: Fractured splined drive



Figure 35: Fractured splined drive



Figure 36: Fractured splined drive

The NTSB forensically examined and conducted metallurgical tests on the fractured splined drive as well as internal components of the hydraulic motor. Examination of the fractured faces of the splined drive revealed spirally smeared surfaces consistent with a torsional overload. The forward section of the splined drive slides into the bearing housing assembly and drives the output shaft. The splined drive was removed from the bearing housing and the output shaft pressed out of the bearing assembly; the splined drive and output shaft are pictured in figure 37.



Figure 37: Output drive and splined drive

Secondary cracking was observed on the geroler end of the spline drive (figure 38), as well as on the end that slides into the bearing housing (figure 39); these secondary cracks are identified with red arrows.



Figure 38: Secondary cracking to geroler side of splined drive



Figure 39: Secondary cracking on splined drive that inserts into bearing housing

Examination of the internal splines in the output shaft revealed mechanical damage on two splines (indicated by red arrows in figure 40) with a wear pattern on the flanks of the other splines.



Figure 40: Internal splines on output shaft

The short end of the splined shaft was cut and metallurgically mounted for polishing, etching and examination. Microhardness test results were considered within the hydraulic motor manufacture's normal experimental tolerances for hardening specifications. Examination of the splines where the splined drive slides into the bearing housing revealed a distinct wear pattern on the flanks that would be loaded while the motor was engaged in parasailing activities. A distinct wear pattern was also observed on the geroler end of the splined drive. Examination of the output shaft that inserts into the brake assembly revealed a wear pattern on the flanks that would be loaded during parasail operations. These wear patterns are consistent with use over an extended period. Examination of the ring pockets of the geroler revealed marks consistent with small particles being trapped between the rollers and the ring pockets.

The NTSB utilized data obtained from a prior testing report to calculate the estimated amount of shear stress needed to cause a torsional fracture of a splined drive during parasailing operations. Although the calculations used data from a 39 foot parasail similar to the 42 foot parasail used during this marine casualty, results indicated that a shear stress in the vicinity of 78,000 lb/in² can potentially cause a torsional fracture and a parasail operated in a wind environment exceeding manufacturers recommended wind speeds has the potential to develop a shear stress in the vicinity of 326,000 lb/in².

The hydraulic motor is presumably the original manufacturer equipment installed by CWS in Lake Havasu, Arizona. The accumulation of paint on the exterior housing, wear patterns on internal components, lack of maintenance records and statements from the vessel owners further lends credence that the motor is presumably original equipment.

2. *Parasail towline:* Three towline specimens were sent to NTSB for analysis: a 40-foot section obtained from SKY SCREAMER that attached to the parasail, a 40-foot section obtained from SKY SCREAMER that attached to the winch drum and a 40-foot length of exemplar rope. Visual inspection of the parted section of line obtained from SKY SCREAMER revealed broken filaments at strand crossovers attributed to fiber abrasion during load and unload cycles.

Examination of the filaments in the strands revealed fused filaments and globules on the tips of the filaments consistent with a tension overload failure. Pull tests were conducted to determine line strength; two line configurations were utilized on each section of line; a combination of a bowline knot and eye splice, the other with two eye splices. Two tensile tests were conducted utilizing eye splices on both ends. The exemplar section of line failed at 13,070 pounds and 13,800 with an average failure of 13,435 pounds which satisfied the manufacturers advertised strength of 13,200 pounds. The section of line obtained from the winch drum failed at 11,160 pounds and 12,260 pounds; the average failure load of 11,710 pounds was 1,490 pounds (11%) below the manufacturer's average breaking strength. The section of line obtained from the parted section failed at 10,100 pounds and 9,600 pounds; the average failure load of 9,850 pounds was 3,350 pounds (25%) below the manufacturer's average breaking strength.

Three tensile tests were conducted utilizing a combination of an eye splice and bowline knot on opposing ends. The exemplar section of line failed at 3,920 pounds, 3,610 pounds and 3,630 pounds; the average failure load of 3,720 pounds was 9,480 pounds (72%) below the manufacturer's average breaking strength of 13,200 pounds. The section of line obtained from the winch drum failed at 3,680 pounds, 3,920 pounds and 3,480 pounds; the average breaking strength of 3,693 pounds was 9,507 pounds (72%) below the manufacturer's average breaking strength of 13,200 pounds. The section of line obtained from the parted line section failed at 3,170 pounds, 3,420 pounds and 3,010 pounds; the average failure load of 3,200 pounds was 10,000 pounds (76%) below the manufacturer's average breaking strength of 13,200 pounds.

Analysis of the failure rates of the three lines tested indicates all three lines sustained a significant reduction of strength attributed to the incorporation of a bowline knot. Testing results for the section of line obtained from the parted section of line revealed a higher failure rate attributed to environmental exposure and cyclical tension wear, as well as shock loading, as evidenced by the observation of broken filaments at strand crossovers.

3. *Associated parasail equipment:* Examination of the associated parasail equipment used during the casualty (parasail, harnesses, life jackets, and multiflyer bar revealed the equipment was in serviceable condition. The parasail displayed damage consistent with fabric being cut by a sharp instrument (presumably during rescue efforts). With the exception of this noted damage, the parasail canopy was found intact and in good condition. Figure 41 is a photograph of the damaged section of the parasail presumably cut by first responders during rescue efforts. The manufacturer's disclaimer label sewn into the parasail indicates the parasail is designed to operate in winds not greater than 12 m.p.h. with a passenger weight load between 180 and 600 pounds; the combined weight of Mr. [REDACTED] and Ms. White did not exceed this weight standard. Weather reports obtained from the National Weather Service indicate the parasail was operated in wind conditions exceeding the manufacturer's recommendations.



Figure 41: Damage to parasail canopy

The multiflyer bar was slightly modified from its original configuration. Four inner passenger support straps (affixed by passing through the bar and sewed to itself) were removed and replaced with two straps that completely wrap around the bar's exterior. Examination of the multiflyer bar revealed slight fading attributed to the elements and abrasions to the protective padding. The ratchet assembly used to offset passenger weight moved with ease. In general, the multiflyer bar appeared to be in good working order. Figure 42 is a photo of the multiflyer bar.



Figure 42: Multiflyer bar

Examination of the harness worn by Mr. [REDACTED] revealed the waist strap was intact and remained secured through the friction buckle after the casualty. A small tear was observed on the passenger's right hand side of the harness. Numerous tears and abrasions were observed in the fabric covering the padding on the back and seat area of the harness. These tears and abrasions exposed padding intended for passenger comfort. The carabiners on the harness that connect to the multiflyer bar functioned freely. Figure 43 is the photo of the harness worn by Mr. [REDACTED]

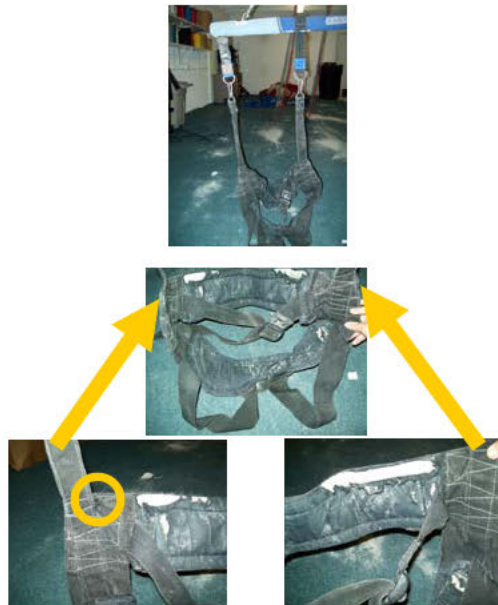


Figure 43: Harness worn by Mr. [REDACTED]

Examination of the harness worn by Ms. White revealed the leg straps were cut by emergency responders (circled below), the waist strap was removed from the friction buckle. The carabineers on the harness that connect to the multiflyer bar functioned freely. Figure 44 is the photo of the harness worn by Ms. White.

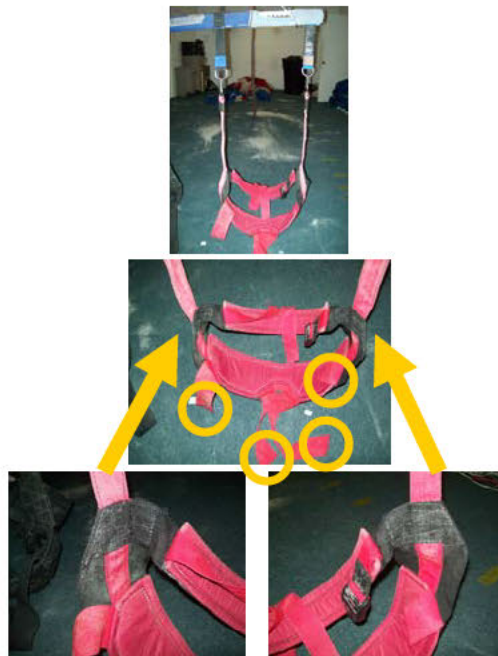


Figure 44: Harness worn by Ms. White

Examination of the parasail riser assembly revealed the riser assembly was faded and exhibited separation of stitching at the yoke where the towline is secured with a bowline knot. Presumably the stitching separation was due to shock loading during the casualty. Photos taken while Mr. [REDACTED] and Ms. White were aloft indicate the stitching was not separated while in flight. Additionally, the forward section of the yoke exhibited signs of previous chafing.

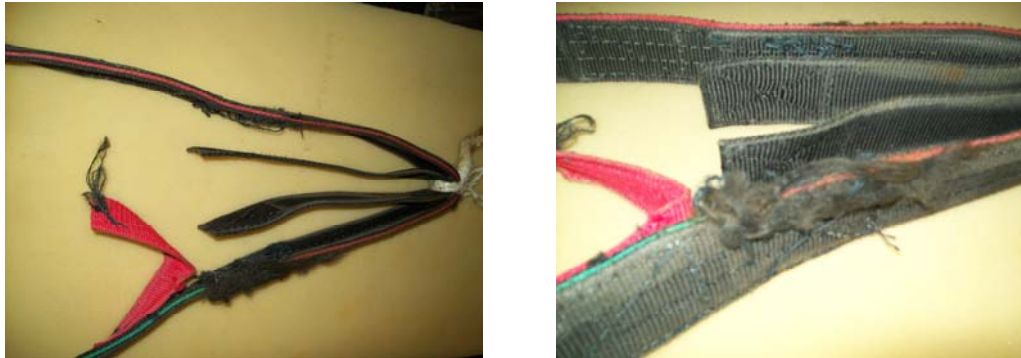


Figure 45: Stitching separation and chafing on parasail yoke



Figure 46: Parted towline at yoke

The roller head assembly located on the tow post is constructed with three rollers (indicated with green arrows in figure 47) to minimize line chafing; the roller head assembly rotates around the vertical axis of the tow post to keep the towline perpendicular to the tow post while the vessel is underway (indicated with a red arrow in figure 47). Examination of the roller head assembly revealed the roller head was limited in its ability to swivel freely. Furthermore, one roller assembly (circled in yellow in figure 47) was bound and unable to move.



Figure 47: Tow post / roller head assembly

4. *Vessel stability*: The SKY SCREAMER, as with all other inspected parasail vessels, received a stability letter as an inspected passenger vessel. The stability requirements for an inspected parasail vessel are found in 46 C.F.R. 170; these requirements do not take into consideration the lateral forces applied to a vessel during parasailing operations. In this casualty, the SKY SCREAMER heeled and nearly capsized from the forces applied by the parasail in high wind. Adherence to several sections of PAPO's OSAG and the parasail manufacturer recommended wind parameters would have precluded operation of the vessel with the approaching storm system thus mitigating the adverse stability implications.

5. *Adherence to regulatory requirements and recommended practices*: PAPO's OSAG contains industry accepted standards for operations and maintenance. As a condition of membership, PAPO members are expected to comply with the OSAG; Sky Screamer Parasail was deficient in complying with several sections of the OSAG.

OSAG – 5 requires captains to ensure vessel maintenance and seaworthiness. It requires a mandatory written log of all daily inspections and maintenance. Operators and crew are tasked with adhering to manufacturer's specifications while engaged in parasailing operations. Mr. [REDACTED] attested to conducting daily inspections of the SKY SCREAMER prior to engaging in passenger operations, but did not maintain a written log. An assortment of maintenance documents and receipts were produced during this investigation, however, these documents did not constitute a comprehensive record and fell short of the intent of OSAG – 5. In addition to written logs, OSAG – 5 requires operators and crews to operate equipment within manufacturer's specifications. The manufacturer's disclaimer label sewn into the parasail indicates the parasail is designed to operate in winds not greater than 12 m.p.h. with a passenger weight load between 180 and 600 pounds. Sky Screamer Parasail lacked the ability to conduct accurate wind speed observations. The SKY SCREAMER was not equipped with an anemometer and relied solely on an employee at the ticket booth to use the internet to research prevailing weather conditions. Without the ability to conduct accurate weather observations, Sky Screamer Parasail lacked the ability to ensure the parasail was flown in winds less than 12 m.p.h.

Weather readings obtained from the time of the casualty indicates winds gusted to over 34 m.p.h., exceeding the manufacturer's maximum wind speed.

OSAG – 7 requires members to conduct daily inspections of the towline and establishes intervals to trim the line's bitter end. PAPO requires members to trim a minimum of 2-feet of line from the bitter end of the towline within a maximum period of 7 days, every 400 flight, or as may become necessary. Trimming of the towline's bitter end removes sections of line where damage is more prevalent to provide a fresh section of line to secure to the yoke with a bowline knot. OSAG – 7 requires operators to keep a written log of all line inspections and trimmings. Mr. [REDACTED] stated he trimmed the bitter end of the line when he felt the line needed to be trimmed; he did not follow PAPO's guidance nor did he maintain a log of line trimmings and was uncertain of the date the line was last trimmed. The intent of OSAG - 7 is to remove sections of line where damage from physical damage is more prevalent. Examination of the line conducted by NTSB revealed broken filaments at strand crossovers attributed to fiber abrasion during load and unloads cycles. The line filaments displayed fused filaments and globules on the tips of the filaments consistent with an overload failure.

OSAG – 13 requires members to conduct a passenger safety brief prior to departing berth. This brief was not conducted by the crew of SKY SCREAMER; in the absence of a proper safety brief, Mr. [REDACTED] and Ms. White never received instruction on the procedures to disconnect from the parasail in the event of a water landing. The two carabineers on each of the parasail passengers' harnesses that secured the harnesses into the parasail assembly were found to be in good working order. A properly conducted passenger safety brief would have provided instruction on how to use the carabineers to disconnect from the parasail in the event of a water landing.

OSAG – 18 requires members to conduct and log daily equipment inspections of parasail systems including: parasail canopies, towline, safety gear, and related equipment to ensure the equipment is properly maintained and in good working order. Mr. [REDACTED] stated he conducted these inspections on a daily basis; a written log of daily inspections was not maintained.

OSAG – 21 requires the vessel's captain to evaluate and log weather conditions to determine if prevailing weather conditions are safe for parasailing operations. OSAG – 21 also requires operators to not conduct parasailing operation in rain, heavy fog or during a known lightning storm within five miles from the parasailing location. NOAA radar observations from 1202 to 1525 reveal an area of thunderstorms forming in the Gulf of Mexico moving onshore Clearwater Beach. Sky Screamer Parasail utilized an assortment of weather sites on the internet to make weather assessments; a weather log was not maintained. Weather information was obtained by employees at the Sky Screamer ticket booth and relayed to vessel captains by VHF radio; vessel captains did not have the ability to monitor weather data while underway.

OSAG – 23 requires vessel captains to evaluate and determine if weather conditions are favorable for parasail operations. It further requires operators to follow parasail manufacturers recommendations when selecting the proper size parasail and prohibits operations in the

following conditions: in sustained winds exceeding 20 m.p.h., in the presence of dangerous winds, when the vessel is not capable of making way with the winch engaged, and when aloft passengers will not descend when the vessel stops forward way.

OSAG – 31 requires all towline contact surfaces to be free from rough or abrasive points and be equipped with a roller system to reduce the potential for abrasions to the line. The roller head assembly did not rotate freely as designed and one roller assembly (as indicated in figure 47) was bound and unable to move freely.

Conclusions:

1. In accordance with reference (c), the Initiating Event (or first unwanted outcome) of this casualty was the mechanical failure of the hydraulic motor.
2. The causal factors that led to the casualty are as follows:
 - a. Environment: There was one primary environmental factor.
 1. Prevailing weather conditions had a substantial role in this casualty. The National Weather Service issued a coastal waters forecast for the waters of Englewood to Tarpon Springs out to 20 nautical miles. The forecast called for winds in the afternoon becoming northwest 5 to 10 knots, seas 2 feet or less, bay and inland waters smooth with isolated thunderstorms in the morning and scattered thunderstorms in the afternoon. Radar images from 1202 and throughout the day indicate a slow moving, developing storm moving east toward Clearwater Beach. As the intense sections of the storm reached the area, winds rapidly increased from 6.93 m.p.h., gusting to 9.17 m.p.h. to 21.92 m.p.h. gusting to 29.97. At the time the parasail passengers were being pulled onshore, sustained winds were 21.92 m.p.h. gusting to 34.44 m.p.h.
 - b. Personnel: There are four primary causal factors that involve human error by Sky Screamer employees or the vessel master.
 1. The failure of Sky Screamer Parasail to assess the changing weather conditions to determine if prevailing weather was conducive to parasailing operations. In the absence of a special weather statement, employees relied on interpreting radar returns from several weather internet sites. Employees stated they observed a storm “hovering” off the coast for several hours preceding the casualty; however, they failed to determine the storms relative motion and growing intensity. Furthermore, employees did not have the ability to monitor actual wind speed/direction to determine if weather conditions were safe to conduct parasailing operations and there was no company policy governing conditions that would require termination of parasailing operations. Prospective passengers stated they were informed that this particular excursion was not scheduled and there were not enough

passengers to go out. The passengers were encouraged by Sky Screamer employees to wait to see if other prospective passengers expressed an interest in an excursion. Once a sufficient number of passengers were confirmed, a Sky Screamer Employee stated they should hurry to board the vessel in order to avoid an incoming storm. This statement indicates that employees knew of the approaching storm and, after an assessment, believed they had sufficient time get in one last excursion before the storm's immanent landfall.

2. The failure of the vessel master to assess changing weather conditions and recognize an approaching severe weather system while underway. Radar images and photos taken from the vantage points of the vessel and onshore during the casualty show a storm front advancing onto Clearwater Beach and the associated deteriorating weather conditions. The determination to cease parasailing operations was made in reaction to deteriorating weather conditions; no proactive assessment was conducted in order to cease operations as a precautionary measure before weather conditions deteriorated.
3. The failure of Sky Screamer Parasail, the vessel master and company employees to fully implement several sections of the PAPO OSAG.
4. The failure of the SKY SCREAMER crew to conduct a passenger safety brief prior to placing passengers in flight. Although the passenger safety brief is a section of the OSAG, it is worth mentioning as a causal factor on its own merit because it is the only section of the OSAG in which passengers have a responsibility to conduct an action. PAPO's pre-board safety briefing (which is intended to be given to all passengers before engaging in parasail operations) contains procedures to unclip from the parasail during a water landing. This document states, "As soon as you land in the water – Calmly un-clip yourself from the canopy, you have two clips to deal with, one clip on your right and one clip on your left, use both hands one to hold the D-ring the other to un-clip. Your crewmember will demo this".

Parasail towline separations may be more prevalent in the parasailing industry than expected because if the requirements of a reportable marine casualty, as defined in 46 CFR 4.05-1, are not met, operators would not be required to notify the Coast Guard. In a recent parasail symposium, several operators stated they experienced a towline separation and did not report the incident to the Coast Guard because the event did not meet the reporting requirements of a reportable marine casualty.

The most probable result of a parasail towline separation is the descending of aloft passengers into the water. Once a passenger is in the water, a passenger can become entangled, pulled under water or pulled on the surface of the water by an inflated parasail. In all scenarios, a passenger safety brief would inform passengers of the procedures to disconnect from a parasail. In this

particular casualty, the carabineers affixing the passengers' harnesses to the multiflyer bar were found to be in good working order. While being pulled through the surf zone, Mr. [REDACTED] was able to pull himself out of the harness with the waist buckle still fastened. It is conceivable that, if instructed, the passengers may have been able to detach from the parasail by disconnecting two carabineers upon entering the water.

- c. Equipment: There are five primary causal factors that involve equipment.
1. High wind conditions generated sufficient shear stress to cause a torsional fracture of the hydraulic motor's splined drive. With the hydraulic motor still engaged, the brake remained disengaged resulting in the entire length of towline free spooling off the drum.
 2. The resulting shock load to the parasail towline when the free spooling line reached the end of the winch drum caused the towline to part at the bowline knot where the line secures to the parasail yoke. Once the parasail separated from the towline, the vessel master lost control of the aloft passengers.
 3. The failure of the towline was attributed to damaged fibers, the reduction of the roller head assembly to function as designed and inconsistent trimming of the towline bitter end. Fiber analysis of the towline closest to the parasail revealed broken filaments concentrated where the strands cross over each other. Broken fibers are characteristic of fiber-on-fiber abrasion experienced during load/unload cycles and contribute to load capacity reduction. The roller head assembly and rollers were designed to move freely in order to reduce line abrasion damage; the reduced ability of these items to move freely negated their ability to function as designed. PAPO requires members to trim a minimum of 2-feet of line from the bitter end of the towline within a maximum period of 7 days, every 400 flight, or on as may become necessary. The intent of this requirement is to remove sections of line vulnerable to abrasion and shock loading damage. Trimming of the line was not conducted in accordance with PAPO requirements.
 4. The use of a bowline knot to secure the towline to the parasail yoke significantly reduced the breaking strength of the towline. The knotted exemplar section of line tested by the NTSB experienced a failure load 72% below the manufacturer's advertised average breaking strength. The industry standard of introducing a bowline knot exacerbated the conditions discussed in the aforementioned paragraph.
 5. The 42 foot parasail was operated in winds exceeding the manufacturers 12 m.p.h maximum wind speed. The effect of the winds buffeting the parasail applied more shear stress to the hydraulic motor splined drive, amplified the

tension to the parasail towline and compromised the stability of the vessel to the point it nearly capsized.

- d. Industry Standards / Safety Regulations: There are five primary causal factors that involve safety regulations.
1. There are no federal regulations that regulate the selection of winch and hydraulic components, towline, parasail canopy and associated running gear. Selection of parasail gear is based on industry standards and can vary from vessel to vessel, as well as region to region. Equipment variations are left up to the decision of the vessel operator/owner; line selection and parasail size have a direct impact to forces applied to the components of the winch drum as well as the stability of the vessel. Various national parasail organizations have established recommended guidelines for the parasail gear selection; however, compliance with these guidelines is voluntary.
 2. There are no federal regulations that regulate maintenance and inspection intervals for parasail equipment. The complex nature of parasail equipment introduces several systems and points of failure worthy of routine maintenance and inspection intervals. Various national parasail organizations have established recommended guidelines for maintenance and inspection; however, compliance with these guidelines is voluntary. Furthermore, these regulations do not place an emphasis on inspecting fitness of hydraulic components (pump, motor, brake assembly, etc.) and winch assemblies (levelwinder, bearings, etc.). No log was maintained to record trimming of the towline involved in this casualty and the line was not maintained in accordance with PAPO's OSAG. The failed hydraulic motor is presumably original equipment that has been in service since the vessel was delivered in 1997. There are no records to indicate the inner workings of this motor were inspected or the motor considered as a candidate for replacement. Internal inspection of the motor revealed shear stress to cause a torsional fracture of the hydraulic motor's splined drive. The inspection also revealed secondary cracking on both ends of the splined drive, distinct wear patterns on the splined drive and output shaft (consistent with use over an extended period of time), and mechanical damage on two internal splines of the output shaft that receives the splined drive. Representatives from motor's manufacturer attending the NTSB analysis of the motor remarked the worn conditions of the internal splines would, under normal circumstances, warrant consideration to replace the motor.
 3. There are no federal regulations that regulate when parasail equipment should be removed from use because the equipment is no longer serviceable.
 4. There are no federal regulations governing allowable weather conditions for commercial parasail operations. Furthermore, there are no federal regulations

requiring commercial parasail operators to monitor changing weather conditions while engaged in parasail operations.

5. Commercial parasail vessels can be either inspected or uninspected. Parasail vessels carrying six or more passengers for hire are inspected under 46 CFR Subchapter T – Small Passenger Vessels Under 100 Gross Tons. Parasail vessels carrying six or fewer passengers for hire are not inspected by the Coast Guard. Regardless if a vessel is inspected or uninspected, the Coast Guard does not have regulations to govern equipment inspection, operation of associated parasailing equipment or parasailing operations.
- e. Stability: The weather conditions in this casualty had a negative impact on the SKY SCREAMER's stability and threatened to capsize the vessel. Stability tests conducted on passenger vessels, to include parasail vessels, do not take into consideration dynamic forces applied to the vessel from the pull of an aloft parasail. As a result of the vessel heeling to starboard, the master lost control of the vessel, a crewmember was ejected, the vessel was placed in danger of capsizing and several passengers sustained injuries as they were thrown about the interior of the vessel.
3. Although not deemed to be a causal factor, it should be mentioned that operators of parasailing vessels are licensed by the Coast Guard to operate passenger vessels. There are no regulations requiring examination of mariners that address the dynamic factors and intricacies of operating a parasail vessel.
4. There is no evidence that the use of dangerous drugs or alcohol contributed to this casualty.
5. This marine casualty investigation identified substantial evidence indicating Sky Screamer Parasail employees and the master of the SKY SCREAMER committed acts of negligence contributing to this casualty by engaging in parasail operations with a storm system advancing onto Clearwater Beach, Florida.
6. With the above exceptions, this marine casualty investigation did not identify any evidence that any personnel of the Coast Guard or of any other agency or any other person contributed to this casualty or to a death involved in this casualty.
7. There is no evidence of misconduct, inattention to duty, negligence or failure to properly respond by the crew of SERENITY.

Recommendations:

Safety:

1. It is recommended that the Commandant of the Coast Guard, along with parasail industry professionals, conduct a review of best safety practices and operating standards published by parasail safety organizations to create a mutually agreed upon set of guidelines for parasail

operators. It is recommended that the consolidated operational guidelines be incorporated into federal regulations.

2. It is recommended that the Commandant of the Coast Guard immediately publish a marine safety alert for dissemination to all parasail operators to address the importance of: proper towline maintenance/replacement, inspection of hydraulic components, monitoring of short and long range weather conditions while passengers are in flight and conducting a preflight passenger safety brief (to include procedures to disconnect from parasail assembly). It is also recommended that this marine safety alert stress the need to adopt and follow operating standards published by a parasail safety organization.

3. It is recommended that the Commandant of the Coast Guard, in conjunction with the Cordage Institute, initiate a study to determine the effect of dynamic forces placed on a towline engaged in parasailing operations. The results of this study should be utilized to create guidelines to address towline selection criteria, line inspection, line maintenance (to include trimming of bitter end) and criteria to remove line from service. Furthermore, it is recommended that this study research an alternative connection to a bowline knot to secure the towline to the parasail without degrading the line's breaking strength.

4. It is recommended that the Commandant of the Coast Guard immediately conduct an outreach effort to parasailing operators recommending immediate inspection of towlines for potential damage. This outreach effort should stress the importance to strict adherence to recommended line maintenance practices established by parasail safety organizations.

5. It is recommended that the Commandant of the Coast Guard consult with manufacturers of hydraulic motors commonly used in the parasail industry to study effects of dynamic forces applied to hydraulic motors used as a component of a parasail winch assembly. Field tests conducted by the NTSB utilized a dynamometer to measure the tension capacity of a parasail winch; the analyzed data, although approximate, suggest operating a parasail in high wind conditions can generate sufficient shear stress to cause a splined drive to fail. It is also recommended that the plausibility of internal inspection of the hydraulic motor (to include nondestructive testing) and criteria to determine the life expectancy of a motor (age, cycle time, etc.) be discussed with manufacturers of hydraulic motors.

6. It is recommended that the Commandant of the Coast Guard conduct a study of all parasail vessels in service to determine the age of hydraulic motors on winch assemblies. Pending the results of recommendation #5, it is recommended that guidance be drafted to propose replacement of motors that have potentially exceeded their life expectancy.

7. It is recommended that the Commandant of the Coast Guard review the stability criteria for passenger vessels engaging in parasailing activities and determine if the towline pull criterion for towing vessels (46 CFR 173.090) can/should be applied to reduce the risk of a loss of stability.

8. It is recommended that the Commandant of the Coast Guard make use of marine inspectors to educate parasail operators of the implications weather has on stability. This outreach should

stress stability is calculated without considering influences from parasail operations and the best way to avoid the negative implications of parasail operations is to be cognizant of weather conditions and operate within the recommended guidelines of parasail industry professionals.

9. It is recommended that the Commandant of the Coast Guard review licensing criteria for parasail operators and crew to determine if additional licensing endorsements should be applied. By its nature, parasailing requires crews to perform tasks not associated with the operation of a traditional passenger vessel. Through education and testing of proficiency, Coast Guard credentialed mariners can gain a better understanding of the dynamics of a parasail vessel.

10. It is recommended that the Commandant of the Coast Guard work with the parasail industry and equipment manufacturers to develop redundant systems to arrest a free spooling winch.

11. It is recommended that the contents of this investigation be given widest dissemination among national parasailing organizations, operators and OCMI zones with parasail operators.

12. It is recommended that the Commandant of the Coast Guard incorporate the findings of this investigation, as well as those from other parasailing casualties, into a formal course module for incorporation into the Investigating Officer and Marine Inspection course curriculum at Training Center Yorktown.

13. It is recommended that the Commandant of the Coast Guard enact regulations to inspect all parasail vessels that carry at least one passenger for hire.

14. It is recommended that the Commandant of the Coast Guard require parasail operators to provide notice to passengers that although parasail vessels are regulated by the Coast Guard, the Coast Guard does not regulate or inspect associated parasailing equipment and flight operations.

Enforcement:

1. It is recommended that Sector Saint Petersburg, which exercises OCMI authority closest to Captain [REDACTED] home of record, conduct a Personnel Action investigation and initiate suspension and revocations against Captain [REDACTED] Coast Guard license for negligence and/or misconduct.

2. It is recommended that Sector Saint Petersburg refer this report for criminal liability against Captain [REDACTED] and Sky Screamer Parasail under 18 U.S.C. 1115. Furthermore, it is recommended that Sector Saint Petersburg initiate civil penalty actions against Captain [REDACTED] and Sky Screamer Parasail for negligent operations under 46 U.S.C. 2302.

Other:

1. It is recommended that this investigation be closed.

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