Aviation Investigation Final Report

Location:	Astoria, Oregon	**Accident Number:**	WPR14LA160
Date & Time:	April 4, 2014, 23:18 Local	**Registration:**	N361CR
Aircraft:	AGUSTAWESTLAND SPA AW109SP	**Aircraft Damage:**	None
Defining Event:	External load event (Rotorcraft)	**Injuries:**	1 Serious, 3 None
Flight Conducted Under:	Part 133: Rotorcraft ext. load		

Analysis

The foreign-registered container ship was inbound to port, and the helicopter was delivering a ship pilot to the ship. Per normal procedures, the helicopter's crew planned to lower the ship pilot to the ship's deck via a cable hoist while the ship was underway. When the helicopter arrived at the ship, dark night conditions prevailed, rain was falling, and the relative wind was blowing onto the starboard (right) bow of the ship. The helicopter crew circled the ship to locate a suitable location to lower the ship pilot and settled upon a location close to the starboard bow. The ship pilot and the helicopter crew agreed that this was the best available location for the transfer. However, this location allowed the helicopter's pilot to see and use only a very small portion of the ship as a visual reference for maintaining the helicopter's position while lowering the ship pilot. Just as the ship pilot made contact with the deck, the ship's bow pitched down, and the helicopter pilot lost visual contact with the ship. Because the helicopter pilot was unable to see the ship, the helicopter began to move aft relative to the ship. The hoist operator was unable to release the hoist cable quickly enough to prevent pulling the ship pilot off the deck and had to cut the cable. The ship pilot fell a few feet to the deck and fractured his scapula.

Ship pilots can be transferred to ships that are underway either by boat or helicopter. The transfer mode determination is made by the ship pilot agency and is typically not made until shortly before the transfer. In this case, neither the ship pilot nor the helicopter crew had complete and accurate knowledge of the ship's deck configuration, particularly with regard to the availability of a suitable location for the transfer, until they arrived at the ship. If a location had been available that would have afforded the helicopter pilot a more encompassing view of the ship, the likelihood of this accident would have been reduced because the helicopter pilot would likely not have lost his visual reference, which would have minimized or eliminated the resulting relative motion between the ship and the helicopter.

The ship pilot agency published procedural guidance for ship operators on helicopter transfers, but that guidance contained only minimal information regarding deck configuration or location requirements for the transfer. There were no published requirements or guidance for the ship to provide information about

its deck configuration and accommodations for a helicopter transfer to the ship pilot agency. The establishment of procedures and practices that require more complete advance notice and pre-coordination of any helicopter transfer arrangements could ensure a higher level of operational safety. Subsequent to the accident, the state's ship pilot board recommended better pre-coordination between ship crews and helicopter operators for any planned ship pilot transfers by helicopter.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The decision by the ship pilot and the helicopter crew to lower the ship pilot to a location on the ship that did not provide the helicopter pilot with an adequate view of the ship. Contributing to the accident was the inadequate pre-mission coordination between the ship, the ship pilot agency, and the helicopter operator.

Findings

Personnel issues	Decision making/judgment - Flight crew
Personnel issues	Decision making/judgment - Other
Environmental issues	(general) - Effect on operation
Organizational issues	Adequacy of policy/proc - Other institution/organization
Organizational issues	Adequacy of policy/proc - Operator

Factual Information

History of Flight

Maneuvering-hover	External load event (Rotorcraft) (Defining event)

On April 4, 2014, about 2318 Pacific daylight time, a ship pilot was seriously injured when he was being transferred via external sling from an Agusta AW109SP helicopter, N361CR, to a container ship that was inbound to the Columbia River mouth near Astoria, Oregon. The helicopter was operated by Brim Aviation, and the ship pilot was a member of the Columbia River Bar Pilots. Neither the helicopter nor the ship was damaged, and none of the three helicopter crewmembers were injured. The flight was conducted as a Class D external load operation under the provisions of Title 14 Code of Federal Regulations Part 133. Light rain and night meteorological conditions prevailed, and a company visual flight rules flight plan was filed for the flight.

The helicopter crew consisted of three persons; the pilot, the co-pilot, and the hoist operator. According to the crewmembers, they intercepted the ship when it was in the Pacific Ocean, about 15 miles from the mouth of the Columbia River, with the mission to deliver the ship pilot onto the ship while the ship was underway. When the helicopter arrived at the ship, the ship pilot and the helicopter crew spent several minutes attempting to determine a suitable location to lower and deposit the ship pilot. They eventually agreed that a small open area near the starboard bow was the best available location and would be used.

When the helicopter was established in a stationary position relative to the ship for the lowering, the helicopter pilot could only see a small portion of the ship's bow area for his reference and station-keeping. Just as the ship pilot touched down on the deck of the ship, the helicopter pilot lost visual reference with the ship, and the helicopter began "drifting" aft relative to the ship. The hoist operator could not pay out cable fast enough to prevent pulling the ship pilot off the deck and then aft. The hoist operator then lost sight of the ship pilot, and in response, he sheared the hoist cable. The ship captain fell a few feet to the ship. He recovered from the fall, and successfully piloted the ship thorough the Columbia River mouth to its destination. Upon disembarkation, he went directly to the hospital, where he was diagnosed with a fractured scapula.

Pilot Information

Certificate:	Airline transport	**Age:**	57
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	February 3, 2014
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 29, 2014
Flight Time:	(Estimated) 5655 hours (Total, all aircraft), 555 hours (Total, this make and model), 5366 hours (Pilot In Command, all aircraft), 63 hours (Last 90 days, all aircraft), 19 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Airline transport	**Age:**	45
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 13, 2013
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 31, 2014
Flight Time:	(Estimated) 7115 hours (Total, all aircraft), 7009 hours (Pilot In Command, all aircraft), 14 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

The helicopter pilot had about 5,655 total hours of helicopter flight experience, including about 555 in the subject helicopter make and model, and 396 hours at night. The pilot was seated in the right seat of the helicopter, and was the flying pilot during the event.

The helicopter co-pilot had about 7,115 total hours of helicopter flight experience, including about 593 hours at night. He was seated in the left seat of the helicopter.

The hoist operator was a former US Coast Guard hoist operator. The hoist and hoist operator were positioned on the right side of the helicopter. In his written statement regarding the event, the injured ship pilot "credit[ed] the experience and professionalism of the hoist operator" in preventing a more serious and adverse outcome.

Aircraft and Owner/Operator Information

Aircraft Make:	AGUSTAWESTLAND SPA	**Registration:**	N361CR
Model/Series:	AW109SP S	**Aircraft Category:**	Helicopter
Year of Manufacture:	2011	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	22243
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	April 4, 2014 AAIP	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	1 Hrs	**Engines:**	2 Turbo shaft
Airframe Total Time:	1323 Hrs	**Engine Manufacturer:**	P&W CANADA
ELT:	Installed, not activated	**Engine Model/Series:**	PW207C
Registered Owner:	U S BANK NA	**Rated Power:**	572 Horsepower
Operator:	Brim Aviation	**Operating Certificate(s) Held:**	Rotorcraft external load (133)

Federal Aviation Administration (FAA) information indicated that the helicopter was manufactured in 2011, and was equipped with two Pratt & Whitney 207C series turboshaft engines.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Unknown	**Visibility**	10 miles
Lowest Ceiling:	Overcast	**Visibility (RVR):**	
Wind Speed/Gusts:	15 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	210°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	10°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	Astoria, OR (KAST)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Astoria, OR	**Type of Clearance:**	None
Departure Time:	22:51 Local	**Type of Airspace:**	Unknown

Wreckage and Impact Information

Crew Injuries:	3 None	**Aircraft Damage:**	None
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 3 None	**Latitude, Longitude:**	46.11,-124.11(est)

Additional Information

Ship and Rendezvous Information

The ship was of German registry, and was therefore required to utilize an appropriately-qualified ship pilot in order to transit the river mouth. According to a report provided by representatives of the ship pilot, the ship was about 730 feet in length, with a beam of approximately 100 feet. Container ships, unlike bulk carriers or other ships, carry their cargo not only in their holds, but also in multiple containers stacked and secured on the deck. Therefore, the above-deck configuration, and consequently the availability of a suitable transfer location for a bar pilot arriving or departing by helicopter, will vary as a function of the container load and load scheme.

According to the ship captain's report, he was notified of the fact that the ship pilot would arrive by helicopter about 28 minutes before the accident occurred, and his first direct contact with the helicopter was about 8 minutes before the accident. At the time of the event, the ship was on a heading of 150 degrees magnetic, at a speed of 17 knots. According to the operator and representatives of the ship pilot, visibility was about 10 miles, under an overcast of unspecified height. Rain was falling, and the wind was from the south-southwest at a speed of about 15 knots, which resulted in a relative wind on the starboard bow of the ship.

Maritime Pilots Information

The Oregon Board of Maritime Pilots (OBMP) is a state agency under the Oregon Public Utilities Commission that regulates the bar pilots. The Columbia River Bar Pilots (CRBP) is a private organization that provides the bar pilots for ships transiting the mouth of the Columbia River. The CRBP transfers (delivers or retrieves) its bar pilots to ships via boat and helicopter. The CRBP owns and operates pilot-transfer boats, and contracts for the helicopter service. According to representatives of the OBMP, for the past several years, helicopters have accounted for approximately 70 percent of the bar pilot transfers, and the subject accident was the first accident involving a helicopter.

Most or all ship operators employ a "vessel agent," which is an individual or company that functions as the liaison between the ship operator and the CRBP (among other agencies). Prior to the arrival or departure of a ship requiring bar pilot services, the CRBP works closely with the vessel agent to coordinate the bar pilot arrangements.

Ship operators utilizing bar pilots pay for the services as a "pilot fee," which is a function of ship tonnage and some other parameters. The rates are set by the OBMP. The pilot fee is not a function of the bar pilot transfer mode, nor is the transfer mode a function of the pilot fee.

The CRBP website provides general guidance for ship operators regarding bar pilot operations, including helicopter transfers. The CRBP website refers ship operators to International Chamber of Shipping (ICS), a London, England-based organization which, according to its website, "is the principal international trade association for merchant shipowners and operators, representing all sectors and trades."

ICS sells a document entitled "ICS Guide to Helicopter/Ship Operations," which "reflects current best practice in the international shipping and aviation industries." The guide contains "extended guidance regarding the role and responsibilities of both the ship and helicopter," and the ICS recommends "that a copy is carried on board every ship." The investigation did not determine whether the shipping company was a member of ICS, whether the ship was aware of, or complied with, any of the ICS transfer procedures, or whether a copy of the guide was available to the ship's captain and crew.

In addition, the CRBP-defined specific transfer guidance is published in Chapter 10 of the National Oceanic and Atmospheric Association (NOAA) document "Coast Pilot Volume 7," which is publicly available at no charge on the internet. In part, that guidance noted that the "primary method of pilot boarding is by helicopter," and that the "Bar Pilots also keep one of 2 pilot boats on standby at all times." The only information regarding deck preparations was that the ship's crew was to "Check that no wires or aerials are above the helicopter maneuvering zone," and to "Check that no loose objects are in or near the helicopter maneuvering zone." The remainder of the guidance discussed communication and maneuvering protocols.

The OBMP and CRBP representatives reported that there is no formal default mode (helicopter vs. boat) for bar pilot transfer operations. The final transfer mode decision is determined by CRBP, and the mode depends on multiple factors, including weather, sea conditions, and ship configuration. Generally, the mode decision is not made until a few hours before the transfer. Irrespective of mode, occasionally pilot transfer attempts are not completed successfully, and sometimes result in a mode change (helicopter instead of boat, or vice-versa).

Until the ship arrives in the local area, the CRBP does not communicate directly with either the ship operator or the ship's crew. Because the CRBP does not communicate directly with the ship operator or the ship's crew until late in the process, CRBP personnel have limited direct knowledge regarding the ship's preparations for the transfer.

The CRBP requires inbound ships to contact CRBP via VHF (very high frequency) radio when they are 3 hours from arrival, and then again when they are 15 miles out, which is approximately 1 hour sailing time. During the '3 hour' contact, the discussions address the basic transfer procedures and arrangements,

including the expected transfer mode. During the '1 hour' contact, the arrangements are finalized, and the expected transfer mode is again discussed. During the radio contact sessions, CRBP personnel attempt to obtain assurance that the ship crew understands and complies with the published transfer procedures, but they lack any certainty regarding such compliance. As a precautionary measure, the bar pilots typically proceed to the ship with the mindset that the ship and crew is not properly configured or prepared. As part of that approach, once in the vicinity of the ship, the bar pilots typically reconnoiter and communicate further with the ship to determine its level of preparedness, and the viability and safety of the intended transfer. Based on that intelligence, the bars pilots then make their final decision regarding whether to proceed with the transfer; sometimes they determine that the transfer would be too risky and they delay it, or switch transfer modes.

In the spring of 2015, due to port/labor contractual issues, container ships no longer use the Columbia River and its ports. It is unknown when container ships will return to the Columbia River. According to OBMP personnel, container ships accounted for about 5 to 6 percent of the commercial ships that used the Columbia River.

Columbia River Bar Pilots Report

The CRBP conducted its own evaluation of the accident and crafted an accident report that was then provided to, and adopted by, the OBMP. According to the OBMP website, the OBMP is Oregon state agency responsible for the promotion of "safe shipping." The CRBP/OBMP accident report determined that the "decision to use the helicopter was normal," and concluded that all involved personnel conducted themselves appropriately.

The report cited four "Lessons Learned," including:

- Recommending some of the ship's crew be physically present in the general deck location of the planned hoist operation.

- Recommending that ship and helicopter crews make "every effort" to establish an agreed-upon "safe place" on the ship for the hoist. This plan includes the request for the ship to fax the "stow plan [ship's deck and cargo layout]" to the helicopter operator to aid in that coordination and determination.

Administrative Information

Investigator In Charge (IIC):	Huhn, Michael
Additional Participating Persons:	John Fisher; FAA FSDO; Portland, OR
Original Publish Date:	November 5, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=89025