



## U.S. COAST GUARD INTERVIEW SUMMARY

Matter Under Investigation: July 12, 2021 Allision of the Liberian flag bulk carrier *Jalma Topic* with the Crescent Towing office barge @ mile 93.5 lower Mississippi river, (NTSB No. DCA21FM032) New Orleans, Louisiana.

Interview Of: Mr. Darius Ascani, Electronics Technician, Mackay Electronics – New Orleans Office

Date/Time: July 15, 2021 @ 1405 local time

Location: In master's conference room, aboard M/V JALMA TOPIC, moored @ Buck Kreihns Dock, mile marker 91.5, LMR

Interviewed By: CWO3 [REDACTED]

Others Present: Master of M/V JALMA TOPIC – Capt. Ivan Druzijanic, & J. Ben Segarra – Wilson Elser Moskowitz Edelman & Dicker, LLP (representing *Jalma Topic* interests), Adam Tucker – NTSB.

Mr. Ascani stated that he was dispatched to the M/V JALMA TOPIC on the morning of July 15, 2021 to troubleshoot an electronics issue with the vessel's YOKOGAWA PT500D – N2 autopilot steering console and motor controller circuit board for the #1 (Starboard) steering pump.

Mr. Ascani stated that upon arriving and discussing the issue with JALMA TOPIC's Chief Engineer, he was told that the possibility of a hydraulic issue with the starboard steering gear pump and associated solenoid valves had been ruled out, as the Chief still had issues with the rudder driving toward port 10 on the rudder angle indicator after changing out the starboard pump's solenoid valves and noted that the steering gear system operated properly when it was controlled by the #2 (Port) steering gear pump. Mr. Ascani stated that the Chief Engineer's opinion was that the issue with the starboard pump had to be related to an electrical and/or electronics failure.

Mr. Ascani stated that before going to the steering gear room, he went to the pilothouse and noted the "SERVO LOOP FAILURE" digital alarm indication on the steering console. He stated that this alarm is visually shown when there is an error in the signal loop between the remote console, the pump motor controller circuit board and the rudder angle position. He further stated that the system has built-in safety parameters relative to the time the rudder takes to respond to an order from the console as well as the variation from the ordered and actual rudder angles. If those parameters are exceeded either for response time or rudder angle variation, this particular alarm will sound, and the remote console needs to be restarted before the alarm can be cleared, even if switching steering pumps.

Mr. Ascani stated that he then went to the steering gear room and visually inspected the steering gear and both the port and starboard steering pump motor controller circuit boards and initially found no visual electronic or electrical failure indicators. The rudder angle indication on the bridge was consistent with the rudder angle inputs as it was mechanically linked. He stated that he then energized the #1 Steering pump and the system's hydraulic ram immediately drove the rudder to full port (approximately 37 degrees). He then stopped the #1 pump motor, started the #2 pump motor and tested the steering system using the #2 pump, finding as the Chief had stated, that the system worked satisfactorily when controlled by the port pump.

Mr. Ascani stated that he again accessed the starboard pump motor controller circuit board and removed the port (solenoid) 2 amp solid state relay, OMRON model number G3R-ODX02SN. He stated that the follow-up and non-follow-up signals from the pilothouse (remote) steering console would pass through this relay, controlling the actuation of the port solenoid valve for the affected steering pump.

Mr. Ascani stated that he then tested this relay with a multi-meter for continuity and resistance, finding that the readings told him that the relay was stuck in the closed (circuit) position and experienced a short circuit, and he opined that two of the possible causes for this condition could be a stuck contact or a burnt out diode, however he made it clear it would require taking apart the relay to confirm and this was not his area of expertise.

Mr. Ascani stated that the Chief Engineer had spare relays for the port and starboard solenoid valve on board. He replaced the existing relays with the spares and retested the system with satisfactory results (no issues observed) and this further contributed to his troubleshooting analysis that the relay that was found stuck in the closed position with a short circuit was the cause of the failure.

When asked if he had witnessed the rudder angle stuck at port 10 degrees when he arrived, Mr. Ascani stated he had not, but only saw that the rudder would drive all the way to port (approximately 37 degrees) as soon as the #1 steering gear pump was energized. When further asked why he thought the steering gear would have initially got stuck at port 10, but now got stuck at port 37, he stated that he did not know, but suggested that electronic failures are often intermittent in nature and it was possible that the Chief Engineer's troubleshooting step of re-energizing the pump motor could have further damaged the relay.

When asked if there was a manufacturer's requirement or good marine practice for maximum hours on this relay, Mr. Ascani stated he was not aware of one, and as long as they used at the correct current, voltage, and ambient temperature, it is not necessary to replace them until they show signs of failure.

When asked what would've happened if the crew had switched steering pumps, it was Mr. Ascani's opinion that they "probably would have regained steering". He did advise that the crew would have had to restart the steering autopilot system by manually switching off and then on to do so, which may not have been apparent, because the normally-displayed warning sticker for the SERVO Loop Alarm directing this action was not affixed to the steering console.

When asked if there were any other factors that may have prevented the failure, Mr. Ascani stated that although solid state relays are a lot more reliable because they have a transistor vice a coil, a better overall system design would have been running the alternating current (AC) voltage straight to the solenoids, without the use of a relay. It was his opinion that having relays in this part of the system negates the redundancy of local (steering gear room) control, as the solenoid valves still respond to the signal from the bridge console so long as it was powered on; however it is an IMO approved design with respect to redundancy.

//s// [REDACTED], CWO3, USCG

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