The Matthiesen was bound for Singapore from the Persian Gulf. The immediate goal was to round Dondra Head, the southern tip of India. As we approached this major turning point, we were not alone. This is a major pinch-point in the Indian Ocean, for most of the east-west traffic. Several hundred vessels, both east and west bound were converging, their positions lit up on our Atlas Krupp radar screens. These were the original equipment radars that came with the ship.

The radars were an old design even when the ship was new. The directional information was taken from the gyrocompass and each of the three radar display units and the self-steering autopilot had a tiny stepper motor inside to mechanically turn a plotting ring, six clicks per degree. As the ship sailed along, gently nodding a degree or two one way and then back with the swell, the soft ticking of the gyro repeater motors, like a series of loud clocks, would gently accompany the action.

Just after eight, as I was preparing to turn in for the night, Jack the Chief Mate poked his head into my office and asked me to come out to the bridge. We bent over one of the radar displays.

“The plots just aren’t right”. he said. “It’s like all the ships are going sideways toward India”.

I stared at the screen for a short time. Jack was right. The vector lines showing the ships’ direction and speed were not tracking the way they should. And all of them were slowly turning the same way. My mind was turning over all the possibilities and I mumbled, “There is something very odd here. It’s too… too... quiet.”

 

I caught the Mate's gaze and in unison we exclaimed, "No gyros!" The tick-tick-ticking was completely silent.

Jack ordered the helmsman to put the ship in hand steering, and ordered the ship brought to a course by the magnetic compass. As the ship turned fully 30 degrees to intercept the correct course, the gyrocompass remained frozen. With no gyro operating, the ship could not be controlled by the autopilot. In fact the autopilot was dead and had let the ship turn whichever direction it wanted.

Casey, the helmsman, steered the ship by hand now, holding a course by squinting at the magnetic compass, trying to mentally even out its swings from side to side to hold us on some semblance of a steady course. The magnetic "Standard" compass had to be outside the steel shell of the ship to feel the Earth's magnetic field. It was located on the flying bridge, about fifteen feet above the bridge where the wheel was. To read it from the steering station, there was a periscope that hung down from the overhead, allowing the helmsman to read the magnetic compass by viewing the bottom of the compass card. The viewing angle was fairly narrow, so the helmsman had to keep his head in a precise spot. Casey had his hands full, trying to see the compass, and interpret its swinging, while nudging our rudder back and forth with the comically small wheel, to follow something approaching a straight course.

I went to the cabinet in the chartroom that held the electronics controlling the gyrocompass and its repeaters. The gyrocompass itself looked fine, holding a course rock solid and humming right along. It was on a back-up battery to maintain the 24-volts that kept it running, in case the power supply failed. If the

gyro lost power, it would spin down, and tumble as it did so. Should this happen while underway, it could take a day or two to re-establish its alignment with the Earth's spin axis. Fortunately, the battery back-up had saved us from this, at least for now.

Next, I opened the repeater amplifier cabinet, and a plume of black smoke billowed out. Smoke inside electronic cabinets is not a good sign. Most electronic technicians will tell you that electronic devices have smoke compressed inside them, as part of the magic that makes them work. Let the smoke out, and they don't work any more.

At this moment the Captain, who had been summoned by Jack, arrived on scene. Although the Captain had no particular knowledge of electronics, it was obvious that all was not well in this cabinet. The inside was blanketed in soot, with acrid wisps of smoke wafting into the chartroom. He shook his head and went on out to the bridge.

I surveyed the damage. A filter capacitor, a relatively common generic part, had failed. It had short circuited and exploded, incinerating a couple of printed circuit board traces and a couple of resistors and filling the cabinet with smoke and bits of aluminum foil. The damage wasn't as bad as it looked. I retired to the radio room to sift through my spare parts. Jack and the Captain stuck their heads in while I was rummaging through the goodies in my junk box.

"It looks like toast," the Captain said. "Are we down for the count?"

"Give me an couple of hours," I replied, "I'll let you know."

I went to work on the charred cabinet, cleaning away the carbon soot and disassembling the circuitry. Taking the main printed circuit board to my workbench in the back of the radio room, I repaired the melted wiring. Although I didn't have exact replacements for the destroyed parts, I had generic values that were close enough to work, so I substituted what I had, mounting the replacement parts more or less where the old ones had been.

About an hour later, I was reassembling the pieces into the cabinet. I hooked everything back up, crossed my fingers, threw the circuit breaker switch and was delighted when nothing immediately blew up in my face. The amplifier circuit was operating normally once again, but the repeaters would all have to be reset. I picked up a pair of walkie-talkie radios from the charger rack in the chartroom.

Walking out to the darkened bridge, I stood against the rear wall to let my eyes adjust to the near total darkness. Casey was working the wheel, following the magnetic compass as it swung back and forth. He was not a happy camper.

"What if you can't fix the autopilot?" Casey asked nervously.

"Well, if the autopilot isn't working, then I guess you will have to hand steer all the way to Singapore," I mused. "That's what, five days away."

Casey was sweating now. His normal evening watch consisted of making coffee and leaning on the windowsill. Instead he was working very, very hard to manually steer. The specter of having to do this for two 4-hour shifts every day for the next week was not pleasant.

I turned to Jack, who was reaching for a radio. “So, I’ll help you reset the repeaters, if you want.” He had heard the ticking of the repeaters come alive a few minutes before.

Jack matter-of-factly headed for the bridge wing. I went back to the gyrocompass and passed the current heading to him on the radio. Then, one by one we reset the repeaters to echo the master gyro, saving the autopilot for last. Once it was properly set, it again tracked the master gyro. The ship could once again steer itself.

“Casey,” Jack said, “you can put it back on the Mike.”

A very relieved Casey complied. Soon he was once again leaning on the windowsill sipping a freshly brewed cup of coffee.

I walked down to the Master’s stateroom. The door was open and knocking, I stuck my head inside.

“Gyro’s back on line and looks normal.” I said. “Jack will pass it to the other watches to be on the lookout for another failure, and to wake me if there is any question.”

“Thanks, and good work.” The Captain replied. “Put down two hours overtime for tonight and for tomorrow night, too.”

When I left the Matthiesen, ten years later, the Gyro amplifier board was still operating with the scrounged parts and wire PC traces that went in that dark night rounding India.

 