

## Repairs to # 4 cylinder on K Topaz Main Engine

Date; Sept. 12, 13 and 14, 2004

Location; New Orleans, LA, USA

The initial damage that was found during the inspection of the included a non visible crack extending parallel to the surface caused by bolt torque and the close proximity to the water feed hole. The exposed edge of the fracture had previously been welded upon to slow down the leak in order to sail into the Mississippi River to make repairs.



Following the inspection on Sept. 9 and 10, 2004, the cylinder stud nuts were re-tightened so that the vessel could move from Cargill Reserve to a point down river to anchor until repairs could be made by LNS US technicians.

Upon arrival of the repair crew Sunday Sept. 12, 2004, they discovered that the damaged area had failed completely to the extent that the entire surface area had lifted and broken off. This made the repair significantly more difficult.



This shows the extent of the seriousness of the new damage that the repair crew was faced with.



This damage measured approximately 300mm X 125mm X 50mm deep.



The broken pieces were fit back in place and clamped to hold them tight enough to start the metal stitching process.





Stitching continues to reattach the broken out pieces



Stitching continues until the repair is complete.



The repair is ground flush to the existing metal surface

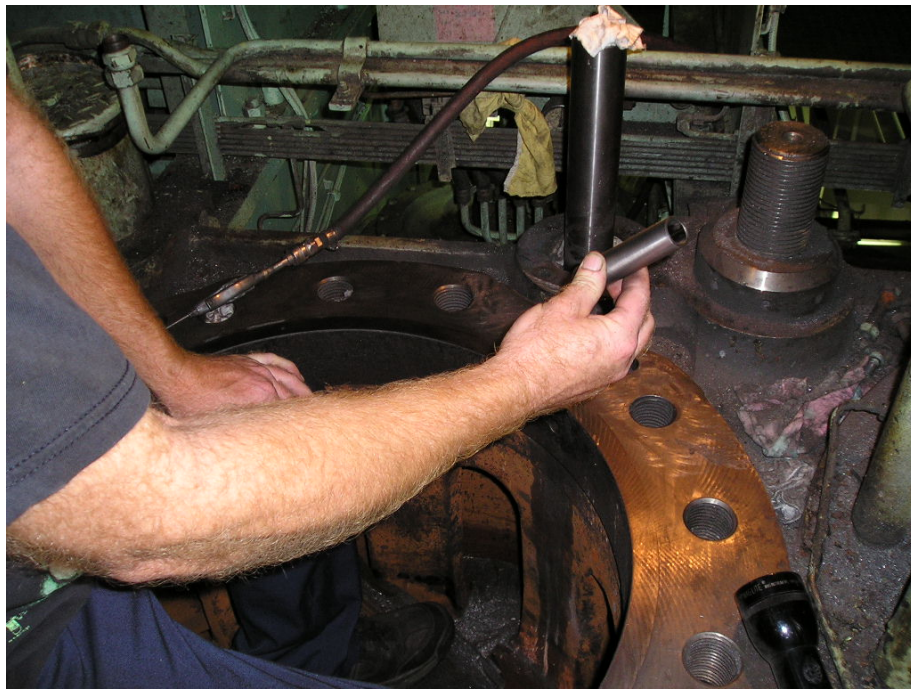


Special threaded water hole and feed tube sleeve are manufactured in California and shipped next day to New Orleans to be installed into the damaged area to repair and seal the cracked water hole to prevent leaking.





The water hole repair insert is installed 75mm deep into the surface to seal the hole



The water feed tube sleeve is ready to be installed into the cracked water feed hole to seal it



The water hole repair is completed



Three new head studs were manufactured in California by LNS crews working around the clock, through the weekend to complete the new studs. The new studs were made longer than the original studs to allow threading deeper into the engine to prevent future cracking. The new studs and tooling to install them were flown to New Orleans by special air freight same day service. The new studs were delivered to the vessel by 0600 on Tuesday morning. The studs were installed and the engine was ready to be reassembled by 1200 hours Tuesday on schedule.

LNS strongly recommends that all studs in this engine be replaced with new longer ones with longer threaded sections to screw into the engine frame. The holes are tapped deep enough but the old studs do not have enough threads and future failures are eminent. Each cylinder has four areas that are at risk of cracking

The center stud that we manufactured and installed needs to be replaced with a longer one because the hole it fits into was cracked deeper than the others and was not apparent during the inspection and because the crack was covered up by the weld.

The requirement to repair this engine as fast as possible have resulted in expensive same day and next day freight charges as well as lots of overtime for crews in the field as well as crews at our factory in California.

Because of the impending arrival of hurricane Ivan, All transportation out of New Orleans had been cancelled in preparation for Ivan by the time our men got off the vessel. We tried every possible way to get our people out of there and ended up chartering a large airplane to fly in at the last possible moment and get them out of harms way. They were taken to Jackson Mississippi to connect with a flight that had not been cancelled.

Their scheduled flight out of New Orleans was cancelled and would not be able to be rescheduled for several days at least. New tickets were purchased to get them home by 1600 hours on Wednesday.