Case Study #4

Fire, Class B

Mishap Analysis Report
CASE STUDY

1. Synopsis:

On 19 June 2009 while CGC was dry-docked side by side at Detyens Shipyard, Inc. in SC, a shipyard worker cut into the CGC shell plating in the starboard, forward corner of Engineering Storeroom # 1 on CGC and ignited supplies stored near the hull of the compartment. The hot work was not authorized, and the worker did not have a hot work permit, fire watch or partner as required by shipyard policy. CGC crew was providing fire watches in the engine room, but no fire watch was posted in Engineering Storeroom # 1 since hot work was not approved or certified safe for hot work.

The DCC discovered white smoke coming from passageway, 2-256-0-l, at approximately 1105 and notified the quarterdeck. The CGC rapid response team arrived on scene and took initial actions with negative results. The CGC Repair II fire team relieved the rapid response team and continued an indirect attack of the fire. The Fire Department (FD) was contacted by Detyens shipyard and arrived on-scene at approximately 1127. FD took the lead in fighting the fire while CGC crew set fire boundaries and investigated surrounding areas. The configuration of the Engineering Storeroom # 1 compartment and a locked storage cage in the compartment restricted access to the fire and hampered firefighting efforts. Shortly after 1300, the fire was reported out and de-smoking procedures commenced. The fire reflashed approximately 35 minutes later and FD reengaged the fire. At approximately 1530, all personnel were removed from the space due to increasing temperatures. At 1600, the shipyard, under direction from the Coast Guard, cut a hole in the shell plating of engineering storeroom # 1 to allow positive ventilation and apply aqueous foam. FD reported the fire out at 1703. Overhaul of the compartment commenced at 1855 and secured at approximately 2130. Three crewmen from CGC were hospitalized for heat stress and released.

2. History:

From summer 2008 to summer of 2009, CGC suffered a series of engineering casualties and discovered numerous instances of degraded material condition which led to a major drydock availability to correct those engineering failures.

While deployed on a JIATF South patrol during summer of 2008 CGC suffered several severe engineering casualties and fires, forcing the termination of the patrol and the return to homeport at Pier of the Training Center (TC), SC on 17 July 2008. Upon returning to homeport CGC crew began repairs on the cutter's engineering plant. On 9 September 2008 CGC was scheduled to start Cutter Annual Readiness and Training (CART); however, due to numerous casualties, CART was postponed. This in turn resulted in the cancellation of CGC Tailored Annual Cutter Training (TACT) which was scheduled to commence 13 October 2008. On 11 September 2008, CGC contacted MLC and reported pest infestation and habitability concerns. In late fall 2008, AREA and MLC representatives conducted a joint materiel condition assessment and advised the Area Commander that both CGC were not safe to sail due to structural and mechanical deficiencies. As a result, the Area Commander recommended and the Commandant

concurred that neither ship met minimum standards for safe operation and would not be deployed until immediate repairs were made. On 04 December 2008, the decision to repair CGCwas made and contract specification development began. In preparation for the upcoming drydock repair availability, CGC needed to go to Naval Station to off load ammunition and would go through CART. On 09 February 2009, CGC departed homeport enroute Naval Station, during the trip the cutter again experienced casualties which forced the cancellation of CART. On 03 March 2009, CGC Commanding Officer was unexpectedly relieved by AREA and a temporary Commanding Officer was assigned. CGC returned to homeport on 5 March 2009 and continued with preparations for the upcoming drydock availability. On 20 March 2009, the temporary Commanding Officer (CO) was relieved by the permanent CO.

On 23 March 2009, CGC commenced a six-month drydock maintenance availability at Detyens Shipyard, Inc. (DSI) SC. The drydock contract included a simultaneous drydock of CGC and totaled approximately $10 million for both ships at the time of award. Due to the large size of the contract and because it included two vessels, the Contracting Officer's Technical Representative (COTR) duties were delegated to the MLC typedesk manager/port engineer who shared formal contract management responsibilities with the MLC Contracting Officer (KO). To reduce some of the burden on the COTR, each cutter's Engineering Officer (EOs) were to assist the COTR with quality assurance of work and safety on the cutters.

Due to severe corrosion, shell plate renewal was a significant amount of the planned work for CGC during the availability. The original contract contained an initial estimate of 1054 square feet of shell plating requiring renewal and included optional items for additional steel renewal based on previous structural analyses which indicated more steel would require renewal. In anticipation of this extraordinary amount of hot work, the contract stipulated that the Coast Guard would provide 20 people per day for fire watch duty and the shipyard would provide all additional fire watches. The fire watch needs for the day were determined at a 0730 meeting every morning. This meeting was attended by a DSI representative and the CGC fire watch coordinator.
On 19 June 2009, DSI conducted the daily 0730 meeting with CGC personnel to discuss the schedule for hot work that day and ensure fire watches were assigned. Hot work chits were not being used by CGC to control and monitor approved hot work. At 0800, DSI personnel completed the daily Competent Person Report verifying that atmospheric conditions for compartments scheduled for hot work were "Safe for Entry/Safe for Hot Work"; Engineering Storeroom # 1, compartment number 3-256-0-A, was not certified "Safe for Hot Work". At 0830, DSI personnel, CG contract COTR, and CGC personnel held the daily work meeting to discuss planned work; the "hull" shop listed several areas where work was planned, but Engineering Storeroom #1 compartment was not identified for hull work.

The morning of 19 June, the DSI Hull shop supervisor assigned shipyard workers to jobs and signed-off on completed welding work. The shipyard policy is to assign workers in pairs for all hot work. Due to an absent worker, one individual was assigned to work by themselves laying out a proposed shell plating renewal area on the starboard forward

corner of Engineering Storeroom # 1. This work had been proposed based on known structural deterioration, but had not yet been negotiated nor authorized by the KO, nor approved by the DSI Hull shop supervisor. As a result, Engineering Storeroom #1 compartment was not certified safe for hot work by DSI and combustibles were not removed from the space. In addition, since the Coast Guard was not notified of the planned hot work, no fire watch was assigned to the space. During his rounds conducting quality assurance inspections of previous work, the supervisor was called by the worker to inspect his markings. The supervisor instructed the worker to revise the layout and that he wanted to see the revised markings when he was done. Since the shipyard worker only spoke Spanish, the supervisor used both verbal and hand gestures to communicate these instructions. The worker revised the hull marking and instead of notifying the supervisor as instructed, began to cut the shell plating. The shipyard worker was located in a scissor lift staged on the drydock floor and made the cut from outside the skin of the ship. The CG fire watch who was assigned to observe other "authorized" hot work on the starboard side of the engine room observed the worker starting to cut and assumed that this was additional hot work that he was assigned to observe. The fire watch observed the worker begin the cut from a pre-existing hole in the hull and continue the cut aft until he was no longer in sight. The path of the cut extended past the bulkhead at Frame 256 and into the shell plating in the starboard, forward corner of Engineering Storeroom # 1, approximately 8-12 inches off the deck. Since the storeroom was not prepared for hot work, (e.g. insulation removed, combustibles taken out of the space, etc.), the storeroom insulation ignited when the worker began cutting into the shell plating.

At approximately 1105, the Damage Control Chief (DCC) notified the quarterdeck of white smoke in the vicinity of the 2-256-0-L passageway. The quarterdeck watchstander sounded the General Emergency Alarm and reported to his inport General Emergency Billet at Repair II (RII) without being properly relieved by the OOD. The DCC, who was assigned as both the Fire Marshal and a Damage Control Training Team (DCTT) member, proceeded to the AFFF station and met up with the CWO BOSN, also a DCTT member. As members of the ship's rapid response team, both donned SCBAs and descended from the messdeck to the aft passageway, compartment 2-256-0-L, to look for personnel in the berthing spaces in the affected area. They immediately noticed smoke coming directly out of an open watertight hatch that leads down to 3-256-0-A, Engineering Storeroom #1. When they realized the smoke was extremely thick and visibility was reduced, both the Fire Marshall and the BOS'N went to the fantail to get a fire hose from contractor-provided temporary firemain manifolds, and to get a Naval Firefighter's Thermal Imager (NFTI). Neither the DCC nor the BOS'N closed the hatch to Engineering Storeroom #1.

The DCC and the BOS'N, along with other rapid response personnel, returned to the scene several times with a contractor-provided fire hose from the fantail. They were able to determine that the fire was in the starboard side of Engineering Storeroom #1, but were unable to access and take any initial action against the fire. They were eventually relieved by RII personnel dressed out in fire-fighting ensembles. Neither the rapid

response personnel nor RII fire teams were able to make significant progress in combating the fire.

Approximately 20 minutes after the DCC's initial report to the quarterdeck, the North Charleston Fire Department (FD) was notified of the fire by DSI and arrived onboard GALLATIN at approximately 1127. The FD received an initial brief from the OOD and was escorted down into the compartment by the BOSN who had an ARGUS thermal imager to show them the fire location. When the BOSN and FD team entered the space, they had no extinguishing device i.e. extinguisher, fire hose, with them to attempt any type of fire suppression. The original configuration of the compartment, as illustrated in Figure #2 of Appendix G, had been altered which made access to the fire location difficult. The BOSN tried to move aft around Vidmars to show FD the location of the fire seat but was prevented by an open manhole cover that accesses the diesel oil overflow tank below. Moving forward he went under the ladder and around a desk to get the closest access to the seat of the fire. Once he moved around the desk he encountered a locked cage that had been installed to store supplies and administrative files. He had a bolt cutter with him to attempt to cut off the lock but found that it was a keyed, internal cylinder lock, not a padlock. Realizing that the heat was becoming more intense, the BOSN and FD evacuated the space to develop a plan. At approximately 1149, the Coast Guard and FD agreed that the FD would lead all firefighting efforts in Engineering Storeroom #1 while GACGC crew would take the lead on fire and smoke boundaries and investigation of adjacent spaces. Command and control of the overall response was assumed by the quarterdeck. SCBA air bottles were collected by the crew and recharged using FD equipment.

CGC crew and the Fire Department carried out this plan and combated the fire until approx 1310 when FD reported the fire was out. At approximately 1330, FD observed temperatures rising again, and within 15 minutes, FD declared a reflash. FD later reported that because of the configuration of the compartment, none of their firefighters were able to directly access the seat of the fire. At approximately 1530, FD was still struggling to combat the fire and requested to cut a hole in the shell of the vessel and spray fire fighting foam from the exterior of the vessel. At 1600, DSI cut the hole and FD personnel sprayed foam inside the compartment for approximately one hour. At approximately 1700, FD reported compartment temperatures falling and that they believed the fire was out. De-smoking commenced, and the compartment was allowed to cool with foam inside. At approximately 1900, FD commenced overhaul. Shortly after 1900, compartment gas-free tests were satisfactory, and at 1930, the crew secured from firefighting efforts.

3. Injuries

	Crew	Fire Fighters	Shipyard	Other	TOTAL
Injuries	03	02*	02**	00	07
Fatalities	00	00	00	00	00
No Injuries	102***	46	06^	00	154

* Two fire fighters were taken to the hospital for treatment and heat exposure. Multiple fire fighters (41) were treated on scene for heat exposure after combating the fire.
** Two shipyard workers were taken to the local hospital and treated for smoke inhalation.
*** Approximate combined personnel totals from CGC (61) and CGC (2) (41). CGC authorized personnel allowance list 162 personnel: 147 personnel attached, -12 personnel on leave, -11 personnel TAD, -30 personnel working at trailer = 94 available. Duty section of + 16 personnel, + 20 personnel fire watch, + 25 miscellaneous personnel = 61 Total. Record keeping of CG personnel involved in maintaining fire boundaries was limited.
^ Unable to accurately determine the number of Detyens Shipyard workers.

4. Damage

Engineering Storeroom # 1, compartment 3-256-0-A suffered a major casualty. The contents of the compartment were severely damaged. The cost to replace the spare parts destroyed in fire was approximately $213K. The cost to repair all damage such as insulation, testing the Halon system, painting the space, re-insulating and running electrical wire is estimated at $300K.