DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5830
Ser N00/ 243
14 Sep 16

FINAL ENDORSEMENT on CAPT (b)(6) and (b)(7)(C), USN, ltr of 11 Feb 16

From: Commander, U.S. Pacific Fleet
To: File

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTY ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

Ref: (i) OPNAVINST F3501.400
(j) OPNAVNOTE 5400

1. I thoroughly reviewed the subject investigation, the supplemental investigation by Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC), and its substantive endorsements by Commander, U.S. Seventh Fleet (COMSEVENTHFLT) and COMNAVSURFPAC. Except as further modified below, I approve the findings of fact, opinions and recommendations as edited by COMSEVENTHFLT's and COMNAVSURFPAC's endorsements.

2. As with most mishaps, a series of factors often contribute to failure. This mishap is no different. A fundamental lack of procedural compliance was the principal cause but contributing factors included: a lack of effective leadership; a culture of complacency and overconfidence by some members of Crew 101 combined with a lack of experience and expertise; and a systemic failure to effectively and completely resolve deficiencies. The investigation, supplemental investigation and endorsements adequately capture the proximate issues and corrective actions.

3. Several key senior-level leadership opportunities to intervene were either missed or poorly executed. Although intervention by leadership above the unit level might not have prevented this incident, leadership should have recognized and addressed the following shortcomings: failure to follow the governing instruction for Crew turnover, specifically not executing the necessary underway demonstration; lack of involvement by LCSRON ONE and DESRON SEVEN in the material assessment during the Exchange of Command; lack of evaluation or certification for the LCSRON ONE Engineering Training Team in accordance with the LCS Training Manual; failure of Crew 101 to complete Engineering Assessments – Pacific's recommended actions prior to conducting Exchange of Command as well as Crew 101's failure to successfully complete full deployment certification. Perhaps most importantly, both the parent ISIC and the operational ISIC recognized they had a Crew whose performance was below that expected of a deployed unit and little to no mitigating actions were taken. It was not an issue of recognizing the performance but more of taking effective action to correct it. These

opportunities were largely missed due to organizational issues above the LCS unit level. Clear, unambiguous command and control functions – who owns what, when - above the unit level are missing.

4. Administrative Changes. By copy of this endorsement, I make the following administrative changes to correct inadvertent scrivener's errors:

a. Delete the following language from para 4.g. (page 56) to Investigating Officer (IO) Opinion #24 as modified by COMNAVSURFPAC's second endorsement: "but **do not concur that CMDCM 3M Liaison duties** under current LCS minimum manning **warrants further study**. Without proper review, I also cannot concur that the proposed 2-week refresher course will provide sufficient knowledge and skills to perform those 3M duties."

b. The supplemental recommendations of COMNAVSURFPAC's second endorsement as well as those listed in enclosure 68 (Supplemental Investigation) are renumbered from Supplemental Recommendations (S-REC) 1 – 15 to Recommendations 40 – 54, following the IO's Recommendations sequentially.

5. Modified Opinion. By copy of this endorsement, I modify Opinion 6 of enclosure 68 (Supplemental Investigation) to include the following amplification:

> "DESRON SEVEN failed to take appropriate action or provide appropriate oversight of a Crew that had a conditional MOB-E certification and demonstrated poor proficiency during their first exercise. However, contributing factors included the failure of LCSRON ONE and EAP to provide sufficient assessment of Crew operational capacity, operability, knowledge and experience; and failure of LCSRON ONE to ensure adequate oversight of, and accountability for, the deployment certification lending to Crew 101 being deployed without having demonstrated adequate operational proficiency."

6. Modified Recommendations. By copy of this endorsement, I modify the following recommendations:

a. IO's Recommendation 12: I concur in part and modify to read:

> "LCSRON ONE and DESRON SEVEN leadership conduct regularly scheduled teleconferences and provide written assessments discussing the performance and certification progress to include personal observation of crews' readiness; strengths and deficiencies for deployed and upcoming crews; set forth operational expectations; and highlight issues that require attention, remedial action or follow-up."

b. IO's Recommendation 31: I concur in part and modify to read:

"COMNAVSURFPAC review the engineering qualification process to ensure alignment with the LCS CONOPS, in particular assess the feasibility of decoupling the assessment of material readiness of an LCS hull from the certification and operational capability of LCS Crews during the Engineering Operational Certification (EOC). Finding of Fact 113 of the IO's report highlights the unique characteristics of littoral combat ships and their crews, noting the difference between other platforms in that for LCSs the EOC is operational vice a material condition and assessment."

c. Recommendation 48 (formerly S-REC 9). I concur in part and modify to read:

"LCSRON ONE, in coordination with PEO LCS, vendor and pipeline training organizations, evaluate the training and qualification process to determine if adequate attention is given to LCS variant anomalies, such as, but not limited to, combining gears and wiped bearing indications."

7. Additional Recommendations. By copy of this endorsement, I add the following recommendations:

Recommendation 55. COMNAVSURFPAC develop and promulgate a deployment model for LCS. This model will include: required, periodic CMAVs to allow sufficient deployed maintenance and support a crew turnover; adequate scheduled underway time to support assessment and final certification of the new Crew; and a mechanism for monitoring and tracking sustainment of deployed LCSs, to include, but not limited to, maintaining critical watch-standing skills and material readiness condition of deployed LCSs.

Recommendation 56. COMNAVSURFPAC in conjunction with COMSEVENTHFLT establish formal LCSRON ONE and DESRON SEVEN lines of authority and accountability during the LCS in-port crew turnover CMAV to include reporting CO relief/turnover complete. As part of this process, review, assess and correct deficiencies with the FLE integration into DESRON SEVEN; and review and provide recommended changes to OPNAVINST F3501.400 (17 Feb 2016) and OPNAVNOTE 5400 (18 Sep 2012).

Recommendation 57. COMNAVSURFPAC develop and promulgate a formal procedure for the parent ISIC to relay the ISIC's concerns regarding the strengths and weaknesses of the deploying Crew to the forward deployed ISIC. The basic deployment certification message provides the team's ultimate performance level but given the complex, high optempo operations conducted, the forward deployed ISIC needs a better understanding of the incoming Crew to be able to determine whether to employ appropriate mitigation procedures if needed.

Recommendation 58. Because LCS crews have historically required multiple attempts to complete EOC, COMNAVSURFPAC review the training, assessment and certification process to determine causal factors and take corrective actions.

Recommendation 59. COMNAVSURFPAC review LCS manning, specifically the engineering watchstanders. Watch team backup is essential during even routine evolutions and becomes more critical as the pace of maintenance or at-sea operations is increased.

Recommendation 60. COMNAVSURFPAC and LCSRON ONE establish hull-specific LOPs for the LCS variants and provide training to rotational crews on the standard and hull-specific LOPs, highlighting hull-specific differences. As part of this process, maintain the list of hull-specific differences, updating the list regularly and disseminate any changes to rotational crews for use and reference during LCS crew turnover.

Recommendation 61. COMNAVSURFPAC develop a timeline and plan to complete the required ATG evaluation and certification of LCSRON ONE training teams. As part of this process, develop a timeline and plan to train and certify LCS Crews for all warfare areas.

Recommendation 62. COMNAVSURFPAC, in coordination with NAVSEA and LCSRON ONE, complete a full review of LCSRON ONE, EOSS, and CO Standing Order procedures and governing instructions then standardize those processes to remove discrepancies across the different sources.

8. By copy of this endorsement, I direct COMNAVSURFPAC to aggressively address and track the issues identified in the subject investigation. Provide updates to COMPACFLT every thirty (30) days from the date of this final endorsement until otherwise directed.

9. COMPACFLT addressed the leadership deficiencies of DESRON SEVEN and LCSRON ONE through administrative actions.

10. My point of contact is Captain (b)(6) and (b)(7)(C) JAGC, USN, who can be reached at (808) 474-7880 or via email at (b)(6) and (b)(7)(C)@navy.mil.

S. H. SWIFT

Copy to:
COMNAVSURFPAC
PEO-LCS
COMSEVENTHFLT
CTF-73
COMLCSRON ONE

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTY ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

COMDESRON SEVEN
CAPT HALL
USS FORT WORTH

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL SURFACE FORCE
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2841 RENDOVA ROAD
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IN REPLY REFER TO
5830
Ser N00/479
9 Jun 16

SECOND ENDORSEMENT on CAPT (b)(6) and (b)(7)(C), USN, ltr of 11 Feb 2016

From: Commander, Naval Surface Force, U.S. Pacific Fleet
To: Commander, U.S. Pacific Fleet

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTY ONBOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

Ref: (h) CPF ltr 5830 Ser N01/0054 of 9 Mar 16

Encl: (68) CAPT (b)(6) and (b)(7)(C), USN, ltr of 1 Apr 2016 w/encls

1. Reviewed as readdressed at reference (h), concurring in the findings of fact, opinions, and recommendations of the Investigating Officer (IO), Supplemental Investigation (SI) and the First Endorser COMSEVENTHFLEET (C7F), subject to the comments and modifications below. I have made additional findings with respect to this incident and general LCS Class matters, and have directed the LCS Class Advocate to begin action on man, equip and train matters appropriate for immediate action. Follow-on action regarding additional findings requirements identified will be forwarded under separate correspondence, recommending ISIC approval and coordination consistent with command and control authorities and procedures.

2. Executive Summary. This endorsement addresses findings in the original IO Report, as well as additional findings contained in the SI at enclosure (68). The SI focused on root and systemic causes of the casualty. The SI complements and does not duplicate the original IO Report, and was tasked to assess whether identified causes are unique to the LCS-community or attributable to lapses in fundamental principles of watchstanding and procedural compliance applicable to all surface platforms. I find the causes of the casualty are not unique to LCS platforms or to some broader LCS culture. Rather, the root causes identify the failure of individual Crew 101 watchstanders and leadership to properly execute and oversee well-established standards that are successfully practiced each day on every surface platform across the fleet. Overall, I concur with both reports that the principal cause of this casualty was gross lack of procedural compliance. I specifically concur with the SI that the specific causes were poor issue resolution, lack of internal accountability, and complacency on the part of the crew.

Though convened on 29 February 2016 after the date of this incident, the ongoing CNO LCS Study may likely address several concerns and potential solutions also identified in opinions and recommendations of both investigations, as adopted or modified in my findings below.

3. Administrative note. The First Endorsement is renumbered from pages 1-3 to pages 52-54 with pen&ink in series with the basic correspondence.

4. Comments on IO Opinions. Concur in the IO's opinions as endorsed, subject to and as modified by the following comments:

a. IO Opinion #2. Specifically concur that the LOP #1 and the CMPDE EOSS procedures were in place and were adequate to prevent the damage from occurring from the PORT and the STBD CGs, if followed.

b. IO Opinion #14, regarding DEOCS surveys of July 2015. Concur in as much that job satisfaction, exhaustion, command communications, and trust in leadership are important indicators of command climate. Exhaustion breeds complacency, which is a known causative factor in this incident. Whether causative in this casualty or not, LCSRON ONE should provide Crew 101 appropriate support to ensure that these indicators in command climate do not become problematic.

c. IO Opinion #17, regarding the FLE not being used in the manner for which it is intended. Specifically concur, and with para. 5.b of the FIRST ENDORSER recommending that the effectiveness of the FLE be reinvigorated.

d. IO Opinion #21, regarding CO CDR Atwell's fleet experience and his capacity to evolve, to gain confidence, and become a more effective leader. I acknowledge the IO's belief in CDR Atwell's potential to learn from this experience. However, his fleet experience noted in the IO's own opinion suggests that CDR Atwell had adequate time and opportunity as a junior officer and in leadership positions, to appreciate and execute procedural compliance to prevent these exact mishaps from occurring.

e. IO Opinion #22. Concur in general that the XO is a hard-charging, experienced, and highly capable SWO. Noting, however, that the XO was partly responsible for the crew's repeated inability to adequately resolve issues.

f. IO Opinion #23, regarding the (b)(6) and (b)(7)(C) **Concur as modified**. Taking into account the IO's observations regarding (b)(6) and (b)(7)(C) experience and tendency towards self-sufficiency, the (b)(6) and (b)(7)(C) duties and responsibilities on a minimally manned crew to stand watch and mentor and oversee the (b)(6) and (b)(7) **does not warrant further study**. This mishap resulted from fundamental lapses in procedural compliance and watchstanding, which includes proper oversight and management of assigned subordinates in the engineering department.

g. IO Opinion #24, regarding challenges that CMDCM Winn faced on an LCS platform having come from the aviation community and his potential role in getting Crew 101 back on track. **Concur as modified**. I concur CMDCM Winn's lack of current surface experience is not a root cause of the accident, (b)(5) [redacted] Accordingly, **LCSRON ONE shall study options** for baseline

competencies and experience, education and training, and criteria for placement of CMDCMs on minimally manned crews to ensure prospective CMDCMs are properly qualified and ready to perform 3M Liaison duties on day-1 of reporting.

5. Comments on IO and C7F Recommendations. Concur as endorsed, subject to and as modified by the following comments:

a. IO RECs #1-3, concur as approved.

b. IO REC #4, that recommended modifying the CO's Standing Orders to include a section on procedural compliance. **Concur in part, rejected in part.** Concur in the importance of emphasizing procedural compliance but reject a need to update the CO's standing orders to ensure implementation of procedural compliance. Existent warfighting serials and "Sound Shipboard Operating Principles and Procedures" provide adequate guidance to ensure all crews employ proper procedural compliance.

c. IO RECs #5-6, concur as approved.

d. IO REC #7, regarding splitting future CNO availabilities between at least two LCS crews to provide each of the crews adequate operational time prior to deployment. **Non-concur and rejected for the following reasons**. Subject to findings in the pending LCS study, changing crews may increase underway time, but creates equal if not greater risk to timely execution and completion of availability. The presence of both crews during availability will significantly mitigate risk to its timely completion, with the added benefit of a mutually supporting training and watchstanding environment between the crews.

e. IO RECs #8-15, concur as approved.

f. IO REC #16, recommending purchase of durable smart tablets for crews to load technical manuals. **Concur as modified.** LCSRON ONE shall study the best means to make technical publications and resources available on station.

g. IO REC #17, regarding spearheading periodic working groups to review active TSOs and LOPs. **Rejected**. Responsibility for reviewing TSOs and LOPs is already performed by Engineering Assessments Pacific (**EAP**). Additionally, special working groups are not convened to review TSOs and LOPs for other hulls and would result in an increased and unnecessary duplication of effort.

h. IO REC #18, concur as approved.

i. IO REC #19, regarding LCSRON ONE work with the systems designers to expedite delivery of the shore-based virtual-reality training facility to improve LCS deck-plate engineers' level of knowledge and operational competence. Concur as modified, clarifying that LCSRON ONE's role in this initiative is in support of primary action that falls under TYCOM cognizance.

j. IO RECs #20-21 / C7F REC 5.d, regarding extending hull turn-overs to 6-8 days and enforce underway demonstration requirement. **Concur as amplified** by the FIRST ENDORSER, that adding rigor to crew turn-over process will increase continuity of maintenance and increase ownership from crew to crew.

k. IO REC #22, regarding adding a Diesel Engine Inspector (DEI) to the LCSRON or CNSP staff to train crews and assess material condition of the MMPDs and SSDGs. Concur as modified, directing LCSRON ONE to study the feasibility of this recommendation as the Class Advocate.

l. IO REC #23 / C7F 5.c, that recommended CNSP N1 re-designate all LCS MPA billets as second tour LDO (6130) and CHENG billets as second tour 1110 Department Head. **Concur as amplified** by the FIRST ENDORSER that attributes for CHENG and MPA should be prerequisites for LCS leadership detailing across the LCS community. Specifically, that CHENG should manage the department, and the MPA provide technical expertise, deck-plate leadership and depth of 3M experience.

m. IO RECs #24, regarding LCSRON ONE standardizing divisional space assignments from hull to hull. **Concur as modified**, that LCSRON ONE, as the Class Advocate, should further study this recommendation for necessity and planning considerations for execution.

n. IO REC #25, regarding LCSRON ONE coordination with CNSP [redacted] to assign a PE in Singapore. **Concur as amplified, noting action complete.** Theater-based PE's provide a critical point of engagement for vessels home-ported in forward areas. Currently there is a 1:1 ratio of PE's to each LCS hull that has been resourced via TAD orders. This will be formalized effective September 2017 based on approved PE Programming for FY-17/18, coincident with projected changes in LCS Homeport assignments. Additional study and recommendations for additional requirements fall under the cognizance of CNSP with support of LCSRON ONE as the Class Advocate

o. IO REC #26 / C7F REC 5.e (citing IO FOF 147), regarding indefinite extension of the contract with Duke Marine Engineering Consultant (DMEC). Concur with the FIRST ENDORSER that extension of the contract may be necessary until such time as there is sufficient depth of experience and technical expertise within the LCS program. **However, do not concur** with the IO that indefinite extension of the contract is necessary or feasible.

p. IO REC #27, concur as approved.

q. IO REC #28, recommending that LCSRON ONE look into the feasibility of increasing engineering manpower with two additional engineers per crew. Concur as amplified, that LCSRON ONE, as the Class Advocate, is properly situated to assess and report findings as recommended.

r. IO RECs #29-31, concur as approved.

s. IO REC #32, recommending that NAVSEA amend the CG/SG HMI software. Concur as amplified. Although the color of the light would not have been an issue had procedures been followed, uniformity in display icons across all platforms should be considered.

t. IO REC #33 / C7F REC 5.a, regarding modification to the MPDE LECP software to add a CG/SG "gear is ready" permissive. Concur as amplified by the FIRST ENDORSER.

u. IO REC #34, recommending that "PEO replace the current Isotta-Fraschini SSDG models on LCS 1 and 3 with either the upgraded models installed on LCS 5 and above, or with SSDGs that are more reliable and less maintenance intensive (e.g., MTU or Caterpillar) . In the interim, increase the level of focus on the existing models to include more frequent grooms before and during deployment." Concur as approved.

v. IO RECs #35-37 / C7F REC #5.b, recommending changes to FLE personnel manning. **Concur as modified,** that LCSRON ONE study the feasibility of changes to FLE manning and report findings.

w. IO REC #38, recommending that "DESRON 7 (**CDS-7**) work with CLWP to schedule opportunities to increase the length of the mid-deployment RAV to accomplish larger scope maintenance actions." **Concur as modified**, that LCSRON ONE study the feasibility of changing mid-deployment RAV and report findings.

x. IO REC #39, regarding personnel actions. Concur as amplified. Additional personnel actions are noted in SI Recommendation (**S-REC**) #15 below.

6. Supplemental Findings. Adopt and specifically concur in the opinions of the SI as modified below, which amplify general observations and necessary follow-on actions identified in the original report.

a. **Issue Resolution**. The leadership of Crew 101 was unable to adequately resolve issues. Multiple events occurred from June 2015 up to the casualty. In each case, the leadership failed to determine the root causes and effectively correct them. This, coupled with the lack of internal accountability such as failing to track Tier 1 and Tier 2 events, significantly contributed to this casualty.

b. **Proper Oversight. CDS-7** failed to take appropriate action or provide appropriate oversight of a crew that had a conditional MOB-E certification and demonstrated poor proficiency during their first exercise.

c. **Miscommunication**. There existed a clear difference between leadership expectations and engineering department execution.

d. **Organizational Relationships**. CDS-7/LCSRON ONE coordination and support regarding the FLE requires review and recommended courses of action to ensure proper use of allocated resources. For example, absorbing liaison element billets into staffs without enforcing their intended primary use to meet FLE requirements.

7. Supplemental Recommendations. Specifically concur in the fifteen (15) SI recommendations, **amplifying only recommendations #1 and #15 as noted below.** All SI recommendation are reprinted below for convenience and identified as "S-REC" to distinguish them from the original investigation.

a. S-REC #1 that "Crew 101/FORT WORTH should be placed in 'Restricted Operations' per reference (d) until CDS-7 assesses the crew to be safe to operate in an unrestricted status. Assessment should include monitored evolutions and level of knowledge examinations": Concur in general, noting the importance of follow through on this recommendation in terms of assessing crew readiness even though operational circumstances have since changed.

b. S-REC #2 that "NAVSEA issue an immediate Class Advisory informing LCS-1 variant crews that the input pinions to the combining gear rotate when engines are started locally."

c. S-REC #3. CDS-7 and LCSRON ONE develop remediation plan for Crew 101's tag-out program and monitor until both organizations assess the program as effective. This remediation and monitoring should be used as one basis of determining if Crew 101 has developed the ability to resolve issues.

d. S-REC #4. CDS-7 and LCSRON ONE develop training plan to address issue resolution with Crew 101's leadership. This plan should include a review and critique of Preliminary Investigations conducted throughout the last year as well as training in how to conduct critiques following events. Training must emphasize root cause analysis, development of short and long term corrective actions and methods to assess effectiveness.

e. S-REC #5. SWOS and LCSRON ONE evaluate current training pipelines to determine how to strengthen training in issue resolution.

f. S-REC #6. CNSP investigate methods for evaluating a crew/ship's ability to resolve issues.

g. S-REC #7. CDS-7 develop a monitoring program for deployed LCS crews to include periodicity, reporting methods and resolution of discrepancies found. The monitoring must focus on watchstanding principles. The program must also include training of Crew leadership to conduct self-monitoring. External monitoring is used extensively in the Naval Nuclear Program and is very effective at reinforcing watchstanding principles and material readiness across the nuclear fleet.

h. S-REC #8. LCSRON ONE/ATG evaluate engineering training and assessments of LCS Crews to determine if current methods are effective in training crews to recognize anomalies, trust indications and practice strict procedural compliance.

i. S-REC #9. (b)(5)

NOTE: This recommendation has a similar recommendation in the original investigation.

j. S-REC #10. LCSRON ONE provide guidance to crews on what evolutions require briefs. At a minimum, briefs should be conducted for infrequent evolutions, testing (to include post repair OPTESTs) and plant light off.

k. S-REC #11. LCSRON ONE, in conjunction with CNSP and ATG, revise reference (d) (LCS Training Manual) to include specific requirements for conditional certifications to include limitations, measures to be put in place to minimize risk, methods to reaching full certification and requirements for deploying with conditional certifications.

l. S-REC #12. CDS-7 use the 8 additional permanent billets to perform the FLE functions as outlined in the LCSRON ONE/CDS-7 MOU. NOTE: This recommendation has a similar recommendation in the original investigation.

m. S-REC #13. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) be disqualified and removed from all watchstanding pending formal upgrade and requalification. NOTE: This recommendation has a similar recommendation in the original investigation.

n. S-REC #14. NAVSEA work with manufacturer to develop a software change that includes a permissive requiring the CG LO system to be operating prior to starting a MPDE locally. NOTE: This recommendation has a similar recommendation in the original investigation.

o. S-REC #15, regarding personnel actions. Concur in the original personnel actions as endorsed, and find personnel actions are warranted for the following additional personnel not identified in the IO Report, namely: XO CDR Austin, (b)(6) and (b)(7)(C) (b)(6) and (b)(7)(C) and CMDCM Winn. The SI recommendation read as follows:

i. As of this writing, the CO was removed from command of Crew 101/FTW. I concur with this action.

ii. Appropriate administrative action for the XO and CMC as well as intensive instruction on issue resolution so they can properly lead the crew.

iii. Appropriate administrative action for the (b) (3) (A), (b) (6) and (b)(6) and (b)(7)

iv. Despite being the one to recognize the casualty, the (b)(6) and (b)(7)(C) contributed to the culture within the Engineering Department, and therefore I recommend appropriate administrative action.

v. As of this writing, (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) were scheduled to appear at (b)(6) and (b)(7)(C) I concur with this disciplinary action.

8. Conclusion. **The findings of the CI and SI Reports, as endorsed and approved, constitute immediate SURFFOR requirements. The LCS Class Advocate will begin to resolve within its respective man, equip and train authorities as directed below, and additional identified requirements will be forwarded under separate correspondence,**

recommending ISIC approval and coordination consistent with command and control authorities and procedures.

9. Action. In accordance with paragraphs 5 and 7 above, I take the following action:

a. I direct the LCS Class Advocate to take or assign actions as appropriate on matters within CNSP ADCON authorities, and report completion within 30 days of this endorsement;

b. Personnel matters are referred to LCSRON-ONE for action in the exercise of its exclusive discretion;

c. Matters involving requirements for NAVSEA and SWOS action are hereby forwarded for ISIC approval and coordination, anticipating follow-on TYCOM execution and tracking to ensure completion. Specifically IO RECs #32-34 and S-RECs #2, #5 and #14.

10. Routing/retention. The original investigation will be forwarded, and copies provided to appropriate commands for action as required.

11. POC for this investigation is CAPT (b) (6), (b) (7)(C), JAGC, USN at (619) 437-2210 or email: (b)(6) and (b)(7)(C) navy.mil.

T. S. ROWDEN

Copy to:
COMNAVSEASYSCOM
PEO-LCS
COMSEVENTHFLEET
CTF-73
COMLCSRON ONE
COMDESRON SEVEN
LCS 3 CREW 101

1 Apr 16

From: CAPT (b)(6) and (b)(7)(C), USN, 1110
To: Commander Naval Surface Forces, Pacific Fleet

Subj: SUPPLEMENTAL INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ONBOARD USS FORT WORTH (LCS 3) ON 12 JAN 2016

Ref: (a) JAG Manual 5800.7F
(b) CAPT (b)(6) and (b)(7)(C) ltr of 11 Feb 16 (CI Report)
(c) COMSEVENTHFLT ltr 5830 Ser N00/084 of 29 Feb 16 (Endorsement)
(d) LCS Training Manual (COMNAVSURFPACINST 3502.2)
(e) Tagout Users Manual, S0400-AD-URM-010/TUM
(f) COMLCSRONONEINST 4700.1F
(g) COMLCSRONONEINST 4700.1E
(f) COMNAVSURFOR Message DTG 311454Z AUG 15
(g) COMNAVSURFORINST 3500.5

Encl: (1) Appointing Order dtd 10 Mar 2016
(2) Appointing Order dtd 10 Mar 2016
(3) Extension Request, Email dtd 29 Mar 2016
(4) CDR Atwell, CO, Crew 101, Statement
(5) CDR Austin, XO, Crew 101, Statement
(6) (b)(6) and (b)(7)(C), Crew 101, Statement
(7) (b)(6) and (b)(7)(C) Crew 101, Statement
(8) (b)(6) and (b)(7)(C) Crew 101, Statement
(9) CMDCM Winn, CMC, Crew 101, Statement
(10) (b)(6) and (b)(7)(C), Crew 101, Statement
(11) (b)(6) and (b)(7)(C), Crew 101, Statement
(12) CAPT Le, CDRE, CDS-7, Statement
(13) Local Operating Procedure #1
(14) LCS Crew 101 EOC Report dtd 15 Jun 2015
(15) Email from CDR Austin dtd 31 Mar 2016
(16) CAPT Buller, CDRE, LCSRON-1, Statement
(17) Email from Mr. (b)(6) and (b)(7)(C), LCSRON-1 (b)(6) and (b), dtd 29 Mar 2016

Preliminary Statement

Purpose and Scope. This supplemental command investigation (CI) was convened by order of Commander, Naval Surface Forces Pacific Fleet and was conducted in accordance with reference (a) and enclosures (1) and (2) from 10 March 2016 through 01 April 2016. The purpose of this CI was to inquire further into the facts and circumstances surrounding the casualties to the Port and Starboard Combining gears reported in references (b) and (c) by assessing the root and systemic causes. Reference (b) included findings covering many different areas of FORT WORTH and the LCS program. This CI narrowed its focus on the casualty itself to include

direct and indirect factors. The purpose of this CI was not to duplicate findings of reference (b), but to dig deeper into the root causes and make recommendations based upon these findings.

Investigation Method and Approach. CAPT [redacted] and I studied reference (b) and began developing problem statements and possible root causes. We then travelled to Singapore to interview key members of Crew 101 and the Commodore of DESRON SEVEN. We also used LCSRON ONE [redacted] as a source of information and answers to technical and program questions during our process. To determine whether the issue resolution problem was systemic across the program or isolated to Crew 101, we interviewed two other LCS Crew Commanding Officers, one who had completed a deployment and the other who had not.

Report Format. All references and enclosures numbers in this supplemental investigation are separate and not serially numbered from the original Command Investigation that constitutes the basic correspondence at reference (b). Due to the comprehensiveness of reference (b), I did not repeat any of the background info or casualty timelines here as they were adequately addressed by CAPT [redacted]. Additionally, some facts were based on findings in reference (b) and are so annotated.

Findings of Fact

Events Preceding the Casualty

1. The Alarm volume in CCS was inaudible. [Ref (b), Encl (11)]

2. On the date in question, there was no pre-evolution brief or communication plan prior to lighting off the Main Propulsion Diesel Engines (MPDEs). Members reported that briefs were not expected for evolutions like this. The CO and [redacted] stated they would have expected a brief for this evolution, but failed to ensure one happened. Reference (g) states that an evolution briefing "should occur immediately prior to any unusual, complex, or infrequent evolution." [Encls (3), (6), (8), (10), (11)]

3. Those asked during the interviews could not provide the basic components of a proper brief. [Encls (3), (10), (11)]

4. [redacted] was not on watch or on a watchbill. He was a Sailor from a different duty section called by the [redacted] to conduct the optest of the MPDEs. [Ref (b), Encl (8)]

5. It is a common practice for Crew 101 to use off-watch Sailors to start/operate/test equipment. [Encl (8)]

6. [redacted] failed to conduct an adequate pre-watch tour prior to starting the MPDEs. [Encl (10)]

7. The CO, XO, [redacted], and (b)(6) and (b)(7)(C) were in the wardroom conducting a meeting concerning SSDG repairs during the light off of MPDEs and subsequent casualty to the Combining Gears (CGs). [Ref (b)]

8. The MPDEs required an OPTEST following repairs to the fuel injectors. [Ref (b)]

9. The ship was originally scheduled to get underway for Hong Kong on 12 January 16 but the date was moved later to accommodate SSDG repairs and was not firm at the time of the casualty. [Ref (b), Encl (37)]

10. Although (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) had performed Local Operating Procedure (LOP) #1 numerous times, they could not recall ever doing so without CG Lube Oil (LO) already running. [Encls (10), (11)]

Casualty

11. (b)(6) and (b)(7)(C) (b)(6) and (b)(7)(C), failed to control the starting of the MPDEs. (b)(6) and (b)(7)(C) was confident in (b)(6) and (b)(7)(C) because he was the most experienced onboard. The [redacted] is the controlling watchstation. [Ref (b), Encl (11)]

12. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) failed to follow LOP #1 for starting the MPDEs. [Encls (10), (11)]

13. (b)(6) and (b)(7)(C) did not have LOP #1 open in CCS. [Encl (11)]

14. (b)(6) and (b)(7)(C) stated that there was no expectation for him to have LOP #1 open in CCS. (b)(6) and (b)(7)(C) stated to CAPT [redacted] in ref (b), "when doing local procedures in the space the [redacted] doesn't breakout the procedure to verify the procedure." [Ref (b), Encl (11)]

15. (b)(6) and (b)(7)(C) stated that a "Local Operating Procedure" was only required to be open at the "Local" watchstation. [Encl (11)]

16. (b)(6) and (b)(7)(C) had LOP #1 open in the space, but was not following any method for marking off each step. [Encl (10)]

17. Formal communication did not exist when (b)(6) and (b)(7)(C) called CCS asking if EOSS procedure MEDA (for aligning the MPDEs) was complete and (b)(6) and (b)(7)(C) thought [redacted] was reporting the MEDA was complete. [Ref (b)]

18. (b)(6) and (b)(7)(C) stated that he cycled through the appropriate screens and thought he had indications that CG LO was running. His review was inadequate because CG LO was not running. [Encl (10)]

19. LOP #1 requires the starting of the CG LO system which can be accomplished remotely by the (b)(6) and (b) at the consoles in CCS or on the bridge or locally in the MMR. [Encl (13)]

20. (b)(6) and (b)(7)(C) stated that he was lighting off both MPDEs at the same time. (b)(6) and (b)(7)(C) admitted that the procedure did not allow for him to do so, but stated that it was common practice to save time. [Encl (10)]

21. (b)(6) and (b)(7)(C) attempted to start PORT MPDE, but it failed to start due to the barring device being engaged though he reported that MCMS showed it disengaged. (b)(6) and (b)(7)(C) disengaged the barring device and started PORT MPDE. He stated he reported this to the (b)(6) and (b).
[Ref (b), Encl (10)]

22. (b)(6) and (b)(7)(C) stated that he usually followed procedures, but he didn't follow the procedure because he "was going so fast trying to catch everything up." [Encl (10)]

23. The (b)(6) and (b)(7)(C), was in the MMR and saw (b)(6) and (b)(7)(C) had the procedure open, but failed to provide adequate watchteam backup and ensure (b)(6) and (b)(7)(C) was following the procedure or marking off completed steps. He was content that the procedure was open.
[Encl (7)]

24. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) failed to monitor the MPDEs and CG for proper system response. [Ref (b), Encls (10), (11)]

25. (b)(6) and (b)(7)(C) received a high bearing temperature alarm, but failed to take action IAW EOCC for Hot Bearing (MHBRG). [Encl (11)]

26. Upon receiving the bearing alarm, (b)(6) and (b)(7)(C) checked shaft rotation (none existed), clutches (none engaged) and CG LO temperature (green) and therefore assumed the hot bearing indication was a problem with a canon plug or the circuit card that had recently changed some bearing setpoints. [Ref (a), Encl (11)]

27. (b)(6) and (b)(7)(C) failed to call away the casualty. [Encl (11)]

28. Following securing of the MPDEs, the (b)(6) and (b)(7)(C) noticed the high bearing temperatures, but failed to direct the (b)(6) and (b)(7)(C), to take actions IAW the EOCC MHBRG. He did not feel they were in an EOCC procedure. [Encl (6)]

29. The CO, (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) each claimed that they had no prior knowledge that the MPDE input shaft rotated inside the combining gear without the clutch engaged.
[Ref (b)]

Contributing Factors

30. There is no interlock to prevent starting the MPDEs locally without adequate CG LO pressure. Interlocks exist for starting remotely. [Ref (b)]

31. The crew was unaware that an EOSS procedure (CMPDE) existed for starting a MPDE locally and used LOP #1. [Ref (b)]

32. Crew 101 received a conditional certification for MOB-E. [Encl (14)]

33. Ref (d) mentions conditional certifications, but provides no direction as to how to resolve or whether or not a crew can be deployed with a conditional certification. [Ref (d)]

34. Neither LCSRON ONE nor DESRON SEVEN put additional measures in place to mitigate risk with Crew 101 deploying with a conditional certification. [Ref (b), Encls (12), (16)]

35. Most of those questioned did not understad that a bearing temperature that rises rapidly and then falls rapidly indicates a wiped bearing. (b)(6) and (b)(7)(C), when given the question in a hypothetical underway situation, answered correctly. [Encls (3), (6), (8), (10), (11)]

36. (b)(6) and (b)(7)(C) did not understand what a wiped bearing is. [Encl (11)]

37. The CO, XO and (b)(6) and (b)(7)(C) had confidence in (b)(6) and (b)(7)(C) as a (b)(6) and (b). The (b)(6) and (b)(7)(C) had concerns about (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) as (b)(6) and (b)s. [Ref (b), Encls (3), (4)]

Command Culture

38. During the last EOC, Crew 101's tagout program was evaluated as ineffective. The CO directed training be held and increased audits to twice a week. No one interviewed (CDRE CDS-7, CO, XO, CMC, (b)(6) and (b)(7)(C)) took any additional measures to improve the tagout program. [Encls (4), (5), (6), (8), (9), (14)]

39. During the audits, the CO reported at least one valve was found tagged in the wrong position and the corrective action was to correct the tag. No investigation was conducted per ref (e). [Encl (4)]

40. In January 2016, LCDR (b)(6) and (b)(7)(C), LCSRON ONE (b)(6) and (b)(7)(C) observed Sailors and contractors hanging and second checking tags at the same time, contrary to refs (e) and (f). Crew 101's leadership was informed. [Ref (b)]

41. Crew 101 was still using ref (g) to govern their tagout procedures despite all crews except USS FREEDOM (due to CNO availability) being directed to use ref (f) effective 21 Sep 2015. Ref (f) eliminated the use of contractor personnel in performing second checks of tagouts due to being in violation of ref (e). [Encls (5), (17)]

42. On 6 June 2015, 500 gallons of lube oil was spilled to the bilge. The command conducted a preliminary investigation, but failed to determine the cause of the spill and hypothesized that someone may have bumped the valve. The XO noted in his endorsement that watchbills were not being followed. Training was directed. The CO and XO were content to move forward

without holding anyone accountable and with training as the only corrective measure. No follow up was conducted to ensure training was effective. [Ref (b), Encls (4), (5)]

43. On 11 June 2015, the CO gave (b)(6) and (b)(7)(C) verbal authorization to conduct an open and inspect of 1A Fuel Oil Purifier without tagging it out. Finding repairs necessary, the (b)(6) and (b)(7)(C) later conducted those repairs without a tagout. LT (b)(6) and (b)(7)(C) was assigned to conduct a preliminary investigation. The CO issued the (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) (b)(6) and (b)(7)(C) (b)(6) and (b)(7)(C). Despite the XO's recommendation that (b)(6) and (b)(7)(C) be issued to (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C), (b)(6) and (b)(7)(C). [Ref (b), Encl (15)]

44. The watchstanders did not have copies of the Sound Shipboard Operating Principles and Procedures, despite ref (h) stating that every Sailor should. [Ref (a)]

45. On 23 March 2016, a Crew 101 Sailor conducted an electrical safety check of CAPT (b)(6) and (b)(7)(C) laptop power cord without using a Maintenance Requirement Card or any other procedure. This was reported to the CO and XO. The following day, the CMC asked for the cord so a proper check could be conducted. [Personal observation]

46. During CARAT Cambodia, the crew punctured the RHIB during recovery. The crew later determined there is an EOSS procedure for boat recovery that they were unaware of. No EOSS scrub or validation was done or requested following the incident. [Encl (12)]

47. Despite expressing concern for CREW 101's proficiency following CARAT Cambodia, COMDESRON SEVEN put no additional measures in place other than "I told my team to be more intrusive" and for "my N4 and his team especially to be on the ship more." [Encl (12)]

48. Despite damaging both CGs, neither COMDESNRON SEVEN nor COMLCSRON ONE considered placing Crew 101 in "restricted ops" per ref (d). COMLCSRON ONE considered this a call to be made by the operational commander. [Encls (12), (16)]

49. Despite damaging both CGs, neither COMDESRON SEVEN nor COMLCSRON ONE instituted any additional measures to ensure Crew 101 is operating equipment safely. COMLCSRON ONE made arrangements to send a team of eight Sailors of various rates to FTW to validate CSMP and CSOSS/EOSS, but was advised by COMDESRON SEVEN not to send the team due to the ongoing investigation. [Encls (12), (16)]

50. Following the casualty, the CO directed a preliminary inquiry be conducted. The CO's endorsement discussed training, software updates, EOSS reviews and to "continually emphasize a culture of procedural compliance", but failed to address how he would tackle procedural compliance and made no mention of holding anyone accountable, despite the PIO's recommendation of (b)(6) and (b)(7)(C) for (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C). [Ref (a)]

51. During questioning of (b)(6) and (b)(7)(C) he failed to recognize any violations of watchstanding principles on his part other than "forceful backup". (b)(6) and (b)(7)(C) could not recite the watchstanding principles to the Investigating Officers. [Encls (10), (11)]

52. Two other LCS Crew Commanding Officers were interviewed and given two scenarios: an ineffective tagout program and 500 gallons of lube oil spilled to the bilge). Each was asked how they would resolve the issue. Both had a clear understanding of proper issue resolution. [Personal Observation]

Other Factors

53. It was clear during our interview of the XO, he was very frustrated with the lack of external support. [Encl (5)]

54. The billets that were shifted to DESRON SEVEN to replace the FLE are not providing the same support the FLE was prior to their dissolution. [Ref (a), Encl (12)]

Damages

55. Estimates into the damage sustained to FORT WORTH's combining gears are still being developed by the maintenance community as of this writing. [Personal Observation]

Opinions

1. As stated in ref (b), the principal cause of this casualty was a clear lack of **procedural compliance** on the part of (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C). A number of issues contributed to this casualty and are addressed below:

a. First and foremost was the command's inability to conduct proper **issue resolution**. First, the open and inspect and follow-on repairs to 1A Fuel Oil Purifier without a tagout. Although (b)(6) and (b)(7)(C) recommended it, the CO is most culpable by granting permission for an open and inspect without a tagout. Then the (b)(6) and (b)(7)(C) moved forward with repairs without tagging out the gear. This should have been a huge indication of a cultural issue, but it was not treated as such. The CO issued (b)(6) and (b)(7)(C) to the (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C), but failed to hold (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) accountable. The CO also failed to recognize the negative message sent to his crew about the negotiability of the tagout program. It was unclear why the CO considered the inspection vital enough to warrant authorization of work without a tagout. Following this, Crew 101 leadership failed to follow up to ensure the crew understood the tagout program and that training was effective. [FF 43]

(1) Second, 500 gallons of lube oil were spilled to the bilge from an improper valve lineup. The investigation was inconclusive and the CO was satisfied to move on. Despite evidence of a potential improper valve line up uncovered during the PI, no one was held accountable and the team was content that someone may have bumped the valve. Additionally, the Engineering Department took no action to ensure valve lineup problems did not recur. [FF 42]

(2) Third, the tagout program was found to be ineffective at EOC. The CO directed training, doubled the audits, but still failed to address the root causes. The CO stated that at least one valve was found to be tagged out of position during an audit and the only correction was to

reposition the valve and replace the tag. No one ever thought to investigate the individuals who hung and checked the tag or to conduct monitored tagout evolutions to ensure training was effective. [FF 38].

(3) During CARAT Cambodia, the crew damaged the RHIB because it wasn't operating with the correct EOSS procedure and didn't even know it existed. There's no indication that any action was taken to explore other "missing" procedures. [FF46]. During LCDR (b)(6) and (b)(7)(C) evaluation of the ship's tagout program in January 2016, he witnessed the hanger and checkers all conducting the tagout together. [FF 40]

(4) Both Combining Gears were run without lube oil and the CO's endorsement of the preliminary inquiry didn't recommend anything more than training and to "continually emphasize a culture of procedural compliance." [FF 50]

(5) Despite taking a ship out of commission by destroying the combining gears, a Sailor conducted an electrical safety check of the Investigating Officer's laptop power cord without a procedure in front of two Navy Captains. [FF 45]

(6) During our interviews with two other LCS Crew COs in which we gave them two hypothetical issues, the two COs displayed sufficient knowledge and skill to conduct proper issue resolution. [FF 52]

(7) Lastly, the common theme across these events was that the command felt training alone would fix the problem then failed to check the efficacy of training with LOK exams or monitored evolutions believing incorrectly that a lack of problems with audits indicates a healthy program. This resulted in lots of talking about procedural compliance, but little deckplate or leadership reinforcement and thus the standard not being set.

b. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) lacked **standards and integrity**. Neither followed the procedures when they clearly knew they were required to. (b)(6) and (b)(7)(C) did not feel he was expected to have LOP #1 open in EOS, yet recognized that he failed to provide **watchteam backup**. When the bearing alarms came in, (b)(6) and (b)(7)(C) talked himself out of any casualty and assumed he knew the cause. Although (b)(6) and (b)(7)(C) stated he usually followed procedures, he failed to follow the procedure this time despite having the (b)(6) and (b)(7) in the space. The (b)(6) and (b)(7) stated he saw the procedure out but did not look at it to see if (b)(6) and (b)(7)(C) was marking off completed steps or if he was following it at all. The (b)(6) and (b)(7) was content with the fact that the procedure was out. This suggests that the ship's leadership failed to enforce procedural compliance, despite always talking about it. [FF 12-16, 22, 23]

c. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) exhibited **complacency and overconfidence.** (b)(6) and (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) had started MPDEs numerous times, but seldom or never from a cold iron condition and therefore failed to recognize CG LO was not running. (b) (3) (b)(6) was overconfident because (b)(6) and (b)(7)(C) was the most experienced engineer onboard. The CO, XO, and (b)(6) and (b)(7)(C) failed to provide adequate forceful backup because they were overconfident in (b)(6) and (b)(7)(C) ability as an (b)(6) and (b)(7)(C). (b)(6) and (b)(7)(C) had concerns about (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C)

(b)(6) and (b)(7)(C) as (b)(6) and (b)(7). Had they dug into the root causes of previous issues with (b)(6) and (b)(7)(C) and (b) (b)(6) they may have realized their confidence was misplaced or have assured themselves that their issues were adequately corrected. [FF 10, 11, 37]

2. Contributing to this casualty was the **lack of formality** that existed within the engineering department.

a. Pre-evolution briefs were not standard practice. Even though the (b)(6) and (b)(7)(C) stated he would have expected a brief for optesting the MPDEs, both of the watchstanders stated they would not have been expected to brief the evolution. [FF 2]

b. Sailors not on the watchbill are commonly used to operate equipment. Even though qualified, this removes the expectation of a pre-watch tour to include familiarizing oneself with equipment status, work occurring on your watchstation, and log review. A proper pre-watch tour would have informed an operator that the CG LO system was not running. [FF 4-6]

c. Communication between (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) were poor and led to confusion over whether or not MEDA had been completed. [FF 17]

3. The crew lacked the requisite **level of knowledge** concerning combining gear operations and indications of a wiped bearing. The crew also lacked a full understanding of the watchstanding principles in that even two months after the casualty, the only principle (b)(6) and (b)(7)(C) believed he violated was forceful backup and (b)(6) and (b)(7)(C) could not recite the watchstanding principles. [FF 29, 36, 50]

4. Despite his four years of LCS engineering experience, (b)(6) and (b)(7)(C) showed a lack of questioning attitude and technical curiosity about the equipment he operates in that he failed to understand the input pinion on the combining gear would turn. Additionally, he failed to properly question why he was receiving bearing temperature alarms on a piece of equipment he believed to be secured. [FF 25, 26, 29]

5. The workload during maintenance periods and the lack of support by the DESRON SEVEN/FLE organization contributed to a feeling of being rushed and overwhelmed, which led to shortcuts such as lighting off two pieces of gear simultaneously. [FF 20, 22, 54]

6. (b)(5) [FF 34, 47]

7. No internal or external monitoring program exists. Even though other classes of conventional ships do not have formal monitoring programs when on deployment, the manning is such that layers of supervision exist at most watchstations on the ship. Given the size of the LCS crew and that only two engineering watchstanders are on watch at any given time, the opportunity for watchteam backup and enforcement of watchstanding principles is limited. [FF 47]

Subj: SUPPLEMENTAL INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ONBOARD USS FORT WORTH (LCS 3) ON 12 JAN 2016

Recommendations

1. Crew 101/FORT WORTH should be placed in "Restricted Operations" per reference (d) until CDS-7 assesses the crew to be safe to operate in an unrestricted status. Assessment should include monitored evolutions and level of knowledge examinations.

2. NAVSEA issue immediate Class Advisory informing LCS-1 variant crews that the input pinions to the combining gear rotate when engines are started locally.

3. CDS-7 and LCSRON ONE develop remediation plan for Crew 101's tagout program and monitor until both organizations assess the program as effective. This remediation and monitoring should be used as one basis of determining if Crew 101 has developed the ability to resolve issues.

4. CDS-7 and LCSRON ONE develop training plan to address issue resolution with Crew 101's leadership. This plan should include a review and critique of Preliminary Investigations conducted throughout the last year as well as training in how to conduct critiques following events. Training must emphasize root cause analysis, development of short and long term corrective actions and methods to assess effectiveness.

5. SWOS and LCSRON ONE evaluate current training pipelines to determine how to strengthen training in issue resolution.

6. CNSP investigate methods for evaluating a crew/ship's ability to resolve issues.

7. CDS-7 develop a monitoring program for deployed LCS crews to include periodicity, reporting methods and resolution of discrepancies found. The monitoring must focus on watchstanding principles. The program must also include training of Crew leadership to conduct self-monitoring. External monitoring is used extensively in the Naval Nuclear Program and is very effective at reinforcing watchstanding principles and material readiness across the nuclear fleet.

8. LCSRON ONE/ATG evaluate engineering training and assessments of LCS Crews to determine if current methods are effective in training crews to recognize anomalies, trust indications and practice strict procedural compliance.

9. (b)(5) **NOTE**: This recommendation has a similar recommendation in the original investigation.

10. LCSRON ONE provide guidance to crews on what evolutions require briefs. At a minimum, briefs should be conducted for infrequent evolutions, testing (to include post repair OPTESTs) and plant light off.

11. LCSRON ONE, in conjunction with CNSP and ATG, revise reference (d) (LCS Training Manual) to include specific requirements for conditional certifications to include limitations, measures to be put in place to minimize risk, methods to reaching full certification and requirements for deploying with conditional certifications.

12. DESRON SEVEN use the 8 additional permanent billets to perform the FLE functions as outlined in the LCSRON ONE/DESRON SEVEN MOU. **NOTE**: This recommendation has a similar recommendation in the original investigation.

13. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) be disqualified and removed from all watchstanding pending formal upgrade and requalification. **NOTE**: This recommendation has a similar recommendation in the original investigation.

14. NAVSEA work with manufacturer to develop a software change that includes a permissive requiring the CG LO system to be operating prior to starting a MPDE locally. **NOTE**: This recommendation has a similar recommendation in the original investigation.

15. The following personnel recommendations are recommended:

a. As of this writing, the CO was removed from command of Crew 101/FTW. I concur with this action.

b. Appropriate administrative action for the XO and CMC as well as intensive instruction on issue resolution so they can properly lead the crew.

c. Appropriate administrative action for the (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C).

d. Despite being the one to recognize the casualty, the (b)(6) and (b)(7)(C) contributed to the culture within the Engineering Department, and therefore I recommend appropriate administrative action.

e. As of this writing, (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) were scheduled to appear at (b)(6) and (b)(7)(C). I concur with this disciplinary action.

(b)(6) and (b)(7)(C)

DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5830
Ser N01/0054
9 Mar 16

From: Commander, U.S. Pacific Fleet
To: Commander, Naval Surface Force, U.S. Pacific Fleet

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTY ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

Encl: (1) CAPT (b)(6) and (b)(6), USN ltr of 11 Feb 2016 w/encl and w/end

1. Enclosure (1) is readdressed and forwarded. Based upon the preliminary review of the facts and circumstances surrounding this casualty and the nature of the investigation to date, Commander, Naval Surface Force, U.S. Pacific Fleet is the appropriate next endorser for this investigation. Upon completion of your review and endorsement, return to Commander, U.S. Pacific Fleet for final endorsement.

2. This letter will become part of the official record.

3. My point of contact for this matter is Captain (b)(6) and (b), JAGC, USN. He may be reached at (808) 474-7880 or (b)(6) and (b)(7)(C)6@navy.mil.

P. G. SAWYER
By direction

Copy to:
COMNAVSEASYSCOM (w/o encl)
PEO-LCS (w/o encl)
CTF-73 (w/o encl)
COMLCSRON ONE (w/o encl)
COMDESRON SEVEN (w/o encl)
USS FORT WORTH (LCS 3) (w/o encl)

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DEPARTMENT OF THE NAVY
COMMANDER, U.S. SEVENTH FLEET
UNIT 200225 BOX 1
FPO AP 96602

5830
Ser N00/084
29 Feb 16

FIRST ENDORSEMENT on CAPT (b)(6) and (b) (b)(6), USN, ltr of
11 Feb 2016

From: Commander, U.S. SEVENTH Fleet
To: Commander, U.S. Pacific Fleet

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTY ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

1. I have reviewed the Investigating Officer's command investigation of 12 January 2016 and approve the findings of fact, opinions, and recommendations of the Investigating Officer.

2. Executive Summary

a. Background. USS FORT WORTH (LCS 3) ("FTW") experienced a casualty resulting in damage to her port and starboard combining gears (CG). Crew 101 conducted an OPTEST on the Main Propulsion Diesel Engines (MPDEs). At the time the MPDEs were started, the CG lube oil system was not aligned. The misalignment of the lube oil system resulted in high temperatures which damaged the CGs.

b. Causation. The principal cause of the damage to the CGs was a failure to follow written procedures. Full procedural compliance would have informed Crew 101 that the CG lube oil system was misaligned. Furthermore, failure to follow the Chief Engineer's Standing Orders by having a reduced volume on the MPCMS alarm system prevented the crew from responding quickly to the situation added to the damage. Lastly, the lack of effective leadership, fatigue, frustration, lack of experience, and failure to utilize external support were all factors that contributed to the casualty.

3. Findings of Fact. I concur with the findings of fact of the Investigating Officer.

4. Opinions. I concur with the opinions of the Investigating Officer.

5. Recommendations. I concur with the recommendations of the Investigating Officer. CAPT (b)(6) did a thorough and systematic assessment of the circumstances leading up to the FTW casualty and recommended actions which will help prevent casualties from occurring in the future. I would like to highlight the following overarching recommendations, in addition to some FTW-specific ones. Of note, due to the unique circumstances of FTW being located in Singapore, most of my recommendations are of even greater import and urgency for FTW and other LCSs stationed overseas. The sensitivities of the host nation as well as the spotlight of international media and foreign militaries only add to the need to execute the LCS program fastidiously.

a. Create a software "fail safe" to prevent a similar occurrence, possibly by NAVSEA modifying the MPDE Local Engine Control Panel (LECP) software to add a combining gear/splitter gear "Gear is Ready" permissive on LECP (local operating panel). Such a change will prevent the MPDE from starting without lube oil to the combining gear. (Recommendation 33)

b. Re-invigorate the effectiveness of the Forward Logistics Element (FLE).

(1) Re-engage the LCSRON ONE with the FLE. The LCSRON must support the DESRON, FLE, and the deployed ships and encourage the FLE to be "hands on, in the plant" as an extension of the crew. The expertise of the LCSRON is needed on site in Singapore for the foreseeable future until there is enough depth of experience within the program, especially in overseas locations. Sufficient LCSRON ONE personnel should be dispatched TAD to Singapore to help train the FLE, until such time as the FLE can perform effectively as an extension of the crew while in port, and are able to support the crew with assessments, ship-checks, and similar actions. Additionally, the LCSRON should perform a "bottom up" administrative program review, to look at areas of perceived "mission creep" of administrative and collateral duties being passed to the ship's crew. (Recommendations 35, 36, 37)

(2) Reinstate the dedicated position of FLE OIC to enable consistent and concentrated focus on LCS maintenance issues. The DESRON (b)(6) should not fill this role as one of his "dual hats." The FLE needs to be able to provide additional senior enlisted engineers to assist the crew in identifying and correcting discrepancies. The FLE should be an extension of the crew when the ship is in port. Gaps in FLE manning should not be accepted. (Recommendation 37)

c. Focused, selective manning. The Chief Engineer (CHENG) should be a second tour SWO Department Head (1110); the Main Propulsion Assistant (MPA) should be a second tour LDO (6130). CHENG must be able to manage the department while MPA provides technical expertise and deck-plate leadership. Additionally, the MPA needs depth of 3M experience. Those attributes should be prerequisites to LCS leadership detailing across the LCS community. (Recommendation 23)

d. Add rigor to crew turnover process. Having the LCSRON or DESRON conduct a material inspection during every turnover will ensure continuity of maintenance, increase ownership from crew to crew, and provide visibility to maintenance requirements. (Recommendation 21) Also, extending the turnover period to include an underway demonstration will provide a minimum understanding of ship operations. (Recommendation 20)

e. The Duke Marine Engineering Consultant (DMEC) personnel provide exceptional technical support to the LCS ship's crews. The contract to support the crews with DMECs should be extended beyond the planned termination in May 2016, until such time as there is sufficient depth of experience and technical expertise within the LCS program. DMECs are a huge bonus to the crew, and the contract's cessation at this time would be very detrimental. (Recommendation related to Finding 147)

6. By copy of this endorsement, Commander, Task Force 73 is directed to take action on the relevant recommendations, including appropriate disciplinary and/or administrative action as recommended by the Investigating Officer.

7. My point of contact for this matter is CDR (b)(6) and (b)(7)(C), JAGC, USN, who can be reached at (b)(6) and (b)(7)(C)@c7f.navy.mil.

J. P. AUCOIN

Copy to:
COMNAVSURFPAC
COMNAVSEASYSCOM
PEO-LCS
CTF-73
CCOMLCSRON ONE
COMDESRON SEVEN
USS FORT WORTH (LCS 3)

11 Feb 2016

From: CAPT (b)(6) and (b)(7)(C), USN, 1110
To: Comma ENTH Fleet

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

Ref: (a) JAG Manual 5800.7F
(b) LCS Wholeness Concept of Operations (CONOPS) 9 Jan 13
(c) LCS Training Manual (COMNAVSURFPACINST 3502.2)
(d) Engineering Department Organization and Readiness Manual (EDORM) (COMNAVSURPACINST 3540.3 series)
(e) FREEDOM Variant Propulsion Operating Guide (POG) V2.0
(f) ARTEC Reduction Gear Training Guide
(g) Exchange of Command Guidance (COMLCRONONEINST 5400.3A)

Encl: (1) Appointing Order dtd 20 Jan 2016
(2) Crew 101 Employment Schedule
(3) USS FREEDOM (LCS1) Employment Schedule
(4) USS H (LCS3 mployment Schedule
(5) (b)(6) and (b)(7)(C) LWP (b)(6) and , Statement
(6) (b)(6) and (b)(7)(C) Por ngineer, email of 3 Feb 16,
(7) CDR Atwell, CO, Crew 101, Biography
(8) CDR Atwell, CO, Crew 101, Statement
(9) CDR Austin, XO, Crew 101, Biography
(10) CDR Austin, XO, Crew 101, email of 3 Feb 16, 1736L
(11) CDR Austin, XO, Crew 101, Statement
(12) CMDCM Winn, CMC, Crew 101, Biography
(13) Crew 101, Statement
(14) (b)(3)(A) and (b)(6), Crew 101, Statement
(15) , Crew 101, Biography
(16) (b)(6) and (b)(7)(C) Crew 101, Biography
(17) Crew 101, Statement
(18) (b)(6) and (b)(7)(C) Crew 101, Statement
(19) (b) (7)(C), (b) (3) (A) Crew 101, Biography
(20) (b)(6) and (b)(7 , Statement
(21) (b)(6) Crew 101, Qualifications
(22) (b) (6), (b) (3) , Crew 101, Statement
(23) (b) (6),(7)(C) , Crew 101, Qualifications
(24) (b) (b)(6) Crew 101, Statement
(25) (6) and (b) xchange of Command Letter dtd 6 Nov 15
(26) PI w/Endorsement into 11m RHIB Incident dtd 3 Dec 15
(27) FTW Engineering Log dtd 16 Dec 15
(28) EOC Procedures for MHBRG
(29) FTW Engineering Log dtd 5 Jan 16
(30) EOC Procedure r MMFOL
(31) Phoncon CAP (b)(6) /LCSRON ONE (b)(6) and (b)(7)(C) Summary 2 Feb 16
(32) LCSRON ONE (b)(6) and artment End ssion Report for 06-14 Jan 1 visit of FTW
(33) CDRE Buller, LCSRON ONE, Statement

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

(34) LCDR [redacted], DESRON 7, [redacted] Statement
(35) FTW E[redacted]ring Log dtd [redacted] Jan 16
(36) CDR Austin, XO, Crew 101, email of 6 Feb 16, 1020L
(37) FTW Master Light Checklist dtd 9 Jan 16
(38) FTW Engineering Watchbill dtd 12 Jan 16
(39) FTW Engineering Logs dtd 12-13 Jan 16
(40) NAVSEA 05D5 FTW Combining Gear Power Point Presentation
(41) Crew 101 Local Operating Procedure #1: Starting/ Stopping MPDEs from the Local Operating Panel
(42) EOSS Procedure CMPDE
(43) MPCMS Alarm Data File Screen Shot for 12 Jan 16
(44) MPCMS Complete Master Data File for 12 Jan 16 (CD)
(45) [redacted] DESRON 7, Statement
(46) [redacted], Crew 101, Statement
(47) [redacted]rsement into Combining Gear Casualty dtd 16 Jan 16
(48) Investigator's Informal Command Climate Survey
(49) NSWCPD Code 512 Reduction Gear Control System Q&A
(50) FTW OCULUS Data CD for 12 Jan 16
(51) [redacted]edure EPOP
(52) [redacted] email of 5 Feb 16, 1940L
(53) [redacted]eering Log dtd 9 Jan 16
(54) [redacted] Crew 101, CSPP
(55) [redacted] Crew 101, CSP
(56) [redacted], LCSRON ONE, [redacted] email of 5 Feb 16, 0947L
(57) ATGP[redacted] MOB-E Summary
(58) EAP [redacted]ports for Crew 101
(59) CDR [redacted], DCDRE, DESRON 7, Statement
(60) LCSR[redacted] Activity Manpower Document Change Request of 21 Mar 14
(61) LCSRON ONE/DESRON 7 MOU re: Forward Liaison Element, with Presentation Slide, dtd 22 Oct 14
(62) Crew 101 DEOCS Survey dtd 6 July 15
(63) COMNAVSURFOR MSG 311454ZAUG15: Procedural Compliance Refresh
(64) PI w/Endorsement into Possible Tag-Out Violation dtd 17 Jun 15
(65) Crew 101 Engineer Officer's Standing Orders dtd 13 Dec 15 (LCSCREW101INST 3540.7A)
(66) Crew 101 CO Standing Orders dtd 21 Oct 2015 (LCSCREW101INST 3120.2I)
(67) CTF-73 FTW CG Repair Location COA Brief of 2 Feb 16

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

INVESTIGATION TABLE OF CONTENTS

PRELIMINARY STATEMENT

Purpose and Scope. This command investigation (CI) was convened by order of Commander, SEVENTH Fleet and was conducted in accordance with reference (a) and enclosure (1) from 20 January 2016 through 12 February 2016. The purpose of the CI was to examine the facts and circumstances related to a casualty which occurred on board USS FORT WORTH (LCS 3) on 12 January 2016 resulting in damage to her PORT and STBD CGs. This CI addresses potential sources or causes, procedural compliance, watchstanding processes and mindset, maintenance and material conditions, and the adequacy of prescribed technical procedures. In addition, it addresses the ship's Engineering Department's culture to include adherence to good engineering practices as well as the ship's overall command climate, to include the function of the command triad. Finally, this report assesses the effectiveness and adequacy of external support organizations necessary to ensure the success of minimally manned ships.

All reasonably available evidence pertinent to the conduct of this CI has been collected. All individuals and witnesses involved in this CI were cooperative, accessible, and forthcoming with all information. All those interviewed provided sworn statements and, where applicable, were advised of their Article 31(b) rights. As a part of this investigation, members of the crew (10 enlisted and 11 officers) were randomly selected to answer a series of questions related to command climate. These individuals were given the opportunity to provide answers anonymously in order to allow them to speak candidly. These are not sworn statements, but do provide opinions regarding Crew 101 and its command climate. These inputs are considered in this CI and since they are not sworn, endorsing authorities may give whatever weight they feel appropriate to this evidence.

All times are stated in local time unless otherwise indicated. All ship's logs are in local time.

Data were retrieved from the MPCMS server for 12 Jan 16 (the date of the casualty). This file contains thousands of real time entries to include all alarms and engineering plant status changes. This excel file is designed so that it can be manipulated in order to locate desired information such as: time, specific alarms, locations, etc. For the purpose of this report, the file was manipulated in order to isolate bearing alarms for specific times associated with the casualty. The snapshot of these alarms is included as an enclosure. The entire data file for 12 Jan 16 is included as well on a separate CD-ROM.

All documentary evidence included herein is certified to be either the original or a copy that is a true and accurate representation of the original document unless otherwise noted.

A glossary of acronyms is included as appendix one at the end of this report. Due to the large number of acronyms, they are, in most cases, not spelled out within the body of the report. It is highly recommended that the reader have the glossary physically next to the report while reviewing.

Investigation Method and Approach I was assisted in this investigation by CDR (b) (6), Commanding Officer of LCS Crew 103. He deployed to aboard FTW from Jan-May 2015 while serving as XO of Crew 103, and d a crew leadership and LCS community point of view. CDR (b) (6) was verbally assigned to this investigation by the Commod ON ONE), CAPT Warren Buller. LCSRON ONE s (b)(6) and (b)(7)(C) provided technical expertise and an C mand inves al ad istra p y LCDR (b)(6) and (b)(7)(C), LT (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) (b)(6) and (b)(7)(C), all a mande roup p e 73 (COMLOGWESTPAC/CTF 73).

In our efforts to understand the cause of the casualty and the associated watchstanders' actions, we reviewed watchstander logs and related technical documentation. In addition, we interviewed all principal watchstanders from the day of the casualty, 12 Jan 16, key members of Crew 101's Engineering Department as well as the command triad.

To understand the broader (outside the lifelines) context in which this incident took place, we reviewed the processes, programs, and nuances that make the LCS program uniquely challenging. We reviewed the training, crew rotation, ship employment, ISIC support, and maintenance community involvement. We also interviewed key members of many external organizations that exist to man, train, equip, or operationally support LCS crews and help ensure their success.

To assess command climate, we reviewed the results of the command's most recent Defense Equal Opportunity Management Institute Organizational Climate Survey (DEOCS), which was conducted in June 2015. Additionally, to assess recent command climate, we asked 11 officers and 10 enlisted personnel (all randomly selected) across several ranks and shipboard departments to fill out hard copy surveys comprised of tailored questions on crew culture and command climate. In order to gather the most honest feedback possible, crew members were given the option to answer the questionnaires on an anonymous basis (which all participants chose to do). Additionally, all participation in these surveys was completely voluntary.

FINDINGS OF FACT

LCS Background Information. All enclosures and references used for this "LCS background information" section are included at the end of this section.

The LCS CONOPS features a new approach to individual, team, unit-level, integrated/advanced phase, and proficiency training to accommodate the minimum ("optimal") manning and rotational crewing concepts.

LCS Core Crews are comprised of approximately 54 Officers and Enlisted personnel. These crews are almost all E-5 and above with at least some form of previous shipboard experience. When embarked on a ship, the Core Crew is notionally augmented with the following operational teams:

a) A 19-person Mission Package Detachment. FTW's current deployment includes the Surface Warfare Mission Package to operate and maintain the ship's 30mm cannons and 11M RHIBs, and to perform the functions of a Visit, Board, Search and Seizure team.

b) A 24-person Aviation Detachment to operate, support and maintain the ship's organic helicopter assets (both manned and unmanned).

Prior to the 2013-2014 time period, Core Crews were comprised of 40 personnel. Crews started receiving 4 Ensigns and a "+10" complement of Enlisted Sailors in 2013-2014 in response to crew feedback that there simply were not enough personnel to properly and safely accomplish the expected mission sets. Included in the "+10" group were three engineering positions: HT1, EN2, and DC3.

Crew training is broken up into two distinct phases; Train to Qualify (T2Q) and Train to Certify (T2C). T2Q is designed to prepare individual watchstanders up to their final qualification. T2C concentrates on watch team training in preparation for final certification.

Because of LCS manpower constraints, crews do not have formal organic Engineering Training Teams (or other training teams found on traditional ships - e.g., Force Protection Training Team, Seamanship Training Team). Instead, LCSRON ONE is responsible for conducting training to prepare the crew for its certifications and the crew is responsible to conduct operational training when deployed.

During pipeline training enroute to their ultimate duty crews, prospective LCS Sailors receive a series of vendor training courses provided by civilian contractors. LCS crews rotate between ship hulls

and off-hull training periods. In a given 12-month period, each crew will notionally spend 4 months training to perform its missions in an off-hull environment, then serve for 4 months on a CONUS-based ship to hone their shipboard skills, and then rotate to an overseas ship platform for a 4 month deployment.

During Calendar Year 2015, Crew 101 loosely followed the 4-month rotational schedule from off-hull to on-hull CONUS to on-hull OCONUS deployment. Highlights of their specific command employment timeline over the last year:

Start date	End date	Crew Milestone
01 Jan 15 (off-hull)	31 Jan 15	MOB-DC and LCS Training Facility (LTF) preparations
01 Feb 15	28 Feb 15	MOB-E, LTF Rapid Refresh, and Fleet Synthetic Trainer-Unit scenarios
01 Mar 15	13 Mar 15	LTF Rapid Refresh continues
14 Mar 15	29 Mar 15	Various crew milestones (e.g., gun shoots, AT/FP training, Physical Fitness Assessment)
30 Mar 15	03 Apr 15 (on-hull)	Crew 101 turns over and assumes command of USS FREEDOM (LCS 1) from Crew 102
06 Apr 15	09 Apr 15	Navigation Check Ride with LCSRON ONE
10 Apr 15	---	CDR Michael Atwell relieves CDR Dale Heinken as CO of FREEDOM and Crew 101
13 Apr 15	03 May 15	Underway Southern California OPAREA
13 Apr 15	24 Apr 15	Various mission area training events (e.g., MOB-E, 11M RHIB ops); Week One Work-ups (WOWU) for Surface Warfare Mission Package (SUW MP); Integrated Ship-Aviation Training Team (ISATT); and Visit, Board, Search and Seizure certification
25 Apr 15	03 May 15	Independent Deployer Certification Exercise with Carrier Strike Group 15
03 May 15	---	FREEDOM arrives inport San Diego
20 May 15	14 Jun 15	Various MOB-E training and preparation events, five EOC attempts.
14 Jun 15		Concluded final EOC attempt
11 Jun 15	16 Jun 15	Transit to dry-dock facility, dry-dock preparations, ship defueling, and crew move to barge berthing
16 June 15	---	FREEDOM enters dry-dock
16 June 15	(ongoing)	FREEDOM Dry-dock Selected Restricted Availability yard period
08 Sep 15	11 Sep 15	Crew 101 conducts turnover and relinquishes command of FREEDOM to Crew 111
08 Sep 15	09 Oct 15	Sustainment Exercise (SUSTEX) planning and execution

21 Sep 15	02 Oct 15	Pre-Overseas Movement crew leave
05 Oct 15	09 Oct 15	Crew 101 provides support to Crew 111's engineering milestone events
24 Oct 15	---	Crew 101 Advance Party flies to Singapore
29 Oct 15	---	Bulk of Crew 101 flies to Singapore
02 Nov 15 (on-hull)	05 Nov 15	Turnover week of FTW from Crew 102 to Crew 101
06 Nov 15	---	Crew 101 assumes command of FTW
08 Nov 15	15 Nov 15	ISATT/WOWU (underway)
17 Nov 15	21 Nov 15	Cooperative Afloat Readiness and Training (CARAT) Cambodia
21 Nov 15	24 Nov 15	Return trip to Singapore (underway)
24 Nov 15	26 Nov 15	Thanksgiving holiday observance
27 Nov 15	30 Nov 15	Preventive Maintenance Availability (PMAV)
01 Dec 15	10 Dec 15	Restricted Availability (RAV)
11 Dec 15	---	Dock Trials
13 Dec 15	21 Dec 15	Underway operations Singapore OPAREA
24 Dec 15	26 Dec 15	Inport for Christmas holiday observance
28 Dec 15	06 Jan 16	Underway to Thailand, port visit, and return trip to Singapore

Because FRE went into a Docking Selected Restricted Availability (DSRA) during Crew 101's On-Hull period, Crew 101 had a total of approximately three weeks of underway time in 2015 prior to their deployment to FTW in November. Additionally, because FRE was in a Continuous Maintenance Availability (CMAV) during their on-hull time, Crew 101 only had approximately three weeks of underway time in 2014.

Crew 101 is the fourth crew on FTW's current deployment. The following is a list of LCS crews that have sailed in FTW since the ship departed for its maiden SEVENTH FLEET deployment in November 2014:

Start Date	End Date	Crew	Notes
Nov 2014	Feb 2015	Crew 104	Sailed FTW from San Diego to Singapore, Jakarta Indonesia pvst, Air Asia search, RAV
Feb 2015	May 2015	Crew 103	Exercise Foal Eagle, 2X S. Korea pvsts, PMAV (Sasebo), NEA Vietnam, RAV, SCS Patrol, IMDEX
May 2015	Nov 2015	Crew 102	4X CARATs (Philippines, Singapore, Indonesia,

			Malaysia), Exercise Malabar, Chennai India pvst, SCS Patrol
Nov 2015	May 2016*	Crew 101	CARAT Cambodia, RAV, Phuket Thailand pvst,
May 2016*	TBD	Crew 111*	*Scheduled

Because of the LCS optimal manning construct, the majority of preventative and corrective maintenance actions are conducted by contracted civilian personnel.

Preventative Maintenance Availabilities (PMAV) are scheduled monthly and PMS checks are split between S/F and contractors. Generally speaking, S/F performs "Monthly" and below PMS checks as well as required "Situational" checks while "Quarterly" checks and above are contracted out. To address corrective maintenance, two week Repair Availabili s (RAV) are scheduled roughly every four months of operation. CLWP [redacted] assigns the corrective maintenance to local contractors or av able government maintenance organizations. [Encl (2)-(6); Ref (b), (c)]

CREW 101 Experience/Manning:

1. The Commanding Officer (CO) of FTW, CDR Michael Atwell, is also currently the CO of Crew 101. He reported to Crew 101 as the Executive Officer (XO) on 10 Nov 13 and fleeted up to CO on 10 Apr 15. [Encl (7), (8)]

2. The CO's prior operational experience includes CICO/ASW Officer on USS THATCH (FFG 43), ASWO on USS GARY (FFG 51), ELECO on USS CARL VINSON (CVN 70), CHENG on USS GRIDLEY (DDG 101), DESRON 31 Material Officer (N4). [Encl (7), (8)]

3. The XO of FTW, CDR Spencer Austin, reported to Crew 101 on 26 Mar 15. Based on a standard 18 month rotation, he is scheduled to fleet up to CO in October 2016. [Encl (9)-(11)]

4. The XO's prior operational experience included COMMO/1st LT on USS VICKSBURG (CG 69), NAV on USS TAYLOR (FFG 50), OPS on USS BENFOLD (DDG 65), and XO/CO on MCM Crew Fearless. [Encl (9)-(11)]

5. The Command Master Chief, CMDCM Dayna Winn, reported to Crew 101 on 14 November 2014. [Encl (12)]

6. Before converting to the Command Master Chief program, CMDCM Winn was an Aviation Structural Mechanic - Safety Equipment (AME rating). [Encl (12)]

7. The (b)(6) and (b)(7)(C)) of FTW, LT (b)(6) and (b)(7)(C), reported to Crew 101 ortly before 10)]

8. The (b)(6) and (b)(7)(C) prior operational experience included enlist service as a Gas e Systems Technician Electrical SE). As a (b)(6) and he has served as (b)(6) and on USS New Orleans (LPD 18) and (b)(6) and on USS KID DDG 100). [En (14), (15)]

9. The (b)(6) and (b)(7)(C), reported to Crew 101 on 14 Nov 14. [Encl (1

10. The (b)(6) and (b)(7 s prior operational experience included ASWO on USS BAINBRIDG DG 96). [Encl (16), (17)]

11. The (b)(6) and (b)(7)(C)", (b)(6) and (b)(7)(C), reported to Crew 101 on 25 Sep]

12. The (b)(6) and (b)(7)(C) prior operational experience included service on USS HARRY D 986), USS JACK WILLIAMS (FFG 24), USS SWIFT (HSV 2), USS JOHN S. MCCAIN (DDG 56), and various MHC/MCM rotational crews. [Encl (19)]

13. (b)(6) and (b)(7)(C) reported to Crew 101 on 06 Dec 2011. [Encl (10)]

14. (b)(6) and (b)(7)(C) was qualified to stand th and perform the funct s assigned on 12 Jan 16. (b)(6) and (b)(7)(C) was qualified in the following LCS watch positions:

- Inport Equipment Monitor (IEM) (29 May 12)
- Engineering Plant Technician (EPT) (24 Jul 12)
- Engineering Duty Officer (EDO) (06 Nov 13)
- Engineering Training Team (ETT) (09 Aug 14)
- Readiness Control Officer (RCO/EOOW) (14 Sep 14)

[Encl (20), (21)]

15. (b)(6) and (b)(7)(C)d (b)(7)(C) reported to Crew 101 on 15 Apr 2011. [Encl (10)]

16. (b)(6) and (b)(7)(C) was qualified to stand t and perform the funct assigned on 12 Jan 16. (b)(6) and (b)(7)(C) was qualified in the following LCS watch positions:

- EPT (15 Feb 12)
- IEM (27 Nov 12)
- ETT (21 Apr 14)
- EDO (13 Dec 15)

[Encl (22), (23)]

17. Neither the (b)(6) and (b)(7)(C) nor (b)(6) and (b)(7)(C) tch in Engineering while the ship is under The (b)(6) and (b)(7)(C) stands watch as Tactical Action Officer (TAO) and th (b)(6) and (b)(7)(C) stands watch as Officer of the Deck (OOD). [Encl (11),),

18. Becaus S program, many senior engineers (b)(6) and (b)(7)(C) ot ha experience (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) are both experienced, having been with Cr over each. [Encl (10), (15), (16), (19), (20), (22), (24)]

19. Crew 101's Engineering Department is manned at 100 percent of the billets authorized from the LCSRON ONE manning plan. [Encl (13)]

EVENTS PRECEDING THE CASUALTY:

20. Crew 101 arrived on FTW and conducted a turnover and Exchange of Command with Crew 102 from 02-06 Nov 15. [Encl (2), (25)]

21. From 08-15 Nov 15, FTW was underway for Integrated Ship Aviation Team Trainer and Week One Work-Ups (ISATT/WOWU). [Encl (2)]

22. From 17-21 Nov 15, FTW participated in Cooperative Afloat Readiness and Training (CARAT) Cambodia. [Encl (2)]

23. During CARAT Cambodia, FTW's 11-meter Rigid-Hull Inflatable Boat (RHIB) was damaged as it was being recovered into the ship's Waterborne Mission Zone. A PI revealed that watchstanders did not know of an existing EOSS procedure and instead used procedures directed in the LCSRON ONE and Commanding Officer's Standing Orders. Additionally, there was an earlier MPDE casualty which resulted in a single-engine plant configuration not addressed in either RHIB recovery procedure. [Encl (8), (11), (26)]

24. From 27 Nov - 10 Dec 15, FTW was in port Singapore conducting a PMAV/RAV. [Encl (2)]

25. From 13-21 Dec 2015, FTW conducted underway operations in the Singapore OPAREA. [Encl (2)]

26. On 16 Dec 15, FTW experienced a hot bearing (220 PORT CG. Review of the Engineering Log indicates the (b) (6), (b) (3) (A), (b) (7)(C) took proper immediate and controlling actions. The ca casualty was eventually determined to be a faulty cannon plug. [Encl (14), (20), (27), (28)]

27. On 28 Dec 15, FTW got underway for a port visit in Thailand (01-03 Jan 16). [Encl (2)]

28. On 05 Jan 16, while underway in the Straits of Malacca, enroute to Singapore, FTW experienced a major fuel oil leak caused by a sheared PORT M f r line. Review of the Engineering Log indicates the [redacted] took proper immediate and controlling actions. [Encl (4) 9), (30)]

29. On 06 Jan 16, FTW pulled into Singapore for a scheduled one week PMAV prior to a planned underway on 12 Jan 16 for a high visibility Hong Kong port visit. [Encl (2), (8), (11), (14)]

30. From 06-14 Jan 16, LCSRON ONE [redacted] LCDR [redacted], visited FTW for the purpose of conducting a pos progr a Pre-AVCERT assist and to assess FTW's material condition of readiness. During the course of his visit he identified a large number of Safe-To-Operate (STO) discrepancies in the engineering spaces which needed to be resolved prior to FTW getting underway the following week. [Encl (8), (11), (14), (31)-(33)]

31. From 06-11 Jan 16, Crew 101 had several competing demands on their time to include: major fuel oil leak clean-up in the MMR, emergent maintenance/repairs on #1, and #4 SSDGs as well as #1 and #2 MPDEs, correction of LCSRON ONE [redacted] material assessment discrepancies, AVCERT preparations, V, LCSRON ONE Commodore visit and making preparations to get underway e following week for a high visibility Hong Kong port visit. CLWP [redacted] stated "this crew was being put through the ringer" to get underway r Hong Kong. [Encl (5), (8), (11), (14), (17), (20), (31), (32), (34)]

32. Following completion of PORT MPDE injector work by contracted maintenance personnel on 11 Jan 16, FTW experienced numerous fuel leaks from the injectors when the head tank was aligned requiring them to tag the MPDE back out to tighten the associated connectors and clean up the resultant fuel spill. These conditions were not properly logged in the Engineering Log as required in the EDORM. [Encl (14), (17), (20), (22), (35); Ref (d)]

33. SSDG repairs and completion of contracted work on FTW's MPDE injectors kept getting delayed, increasing the work load and pressure on the engineers to complete and OPTEST MPDEs prior to the next scheduled underway. [Encl (8), (11), (14), (22)]

34. FTW was originally scheduled to get underway on 12 Jan 16 to support the Hong Kong port visit, but this date was slipping day for day to complete repairs on the SSDGs. The CO and XO acknowledged they were feeling a "tremendous amount of pressure" from the operational chain of command to get underway. The CO stated, if necessary, he was prepared to tell the DESRON 7 Commodore he could not get underway safely on time to meet the Hong Kong commitment. [Encl (8), (11), (36)]

CASUALTY:

35. On 12 Jan 16, FTW had just completed a PMAV and was undergoing an informal maintenance window of opportunity and preparing for its next underway period in port Changi Naval Base, Singapore. [Encl (2), (5), (11))

36. Crew 101 needed to OPTEST the MPDEs before continuing with their pre-underway checks in accordance with MLOCs. [Encl (8), (11), (14), (20), (22), (37)]

n 16, (b)(6) and (b)(7)(C) was assigned as the (b)(6) and (b)(7)(C) and w ral Control Station ((b)(6) and (b)(7)(C) time of the casualty. [Encl (20), (22), (38), (39)]

38. (b)(6) and (b)(7)(C) was neither on duty nor on the Engineering Watchbill on 12 Encl (20), (22), (38), (39)]

39. At 1037 on 12 Jan 16, (b)(6) and (b)(7)(C) reported to the (b)(6) and that he had aligned #1 and #2 MPDEs in with MEDA. [Encl 0), (22), (39)]

40. Sometime between 1330 and 1349 on 12 Jan 16, (b)(6) and (b)(7)(C) was working on 3M reports and Zone Inspection Deficien IDLs) in the ship's Oil Lab and was summoned by the EDO to report to the MMR to start both MPDEs for testing. [Encl (20), (22)]

41. At 1355, the (b)(6) and started #2 Fuel Oil Service Pump (FOSP) IAW EOSS procedure CFOP. [l (20), (39)]

42. Between 1355 and 1421, (b)(6) and (b)(7)(C) was directed by (b)(6) and (b)(7)(C) to conduct leak checks on the M l service systems s were detected. [Encl (20), (22)]

43. Between 1355 and 1421, (b)(6) and (b)(7)(C) called the CDO to get permission to start the MP O obtained permission from the CO and gave permission to (b)(6) and (b)(7)(C) to start the MPDEs. [Encl (8), (20)]

44. Start permissives are prerequisites which must be met before MPCMS or LECP will enable the MPDE to start. In other words, if any one of the permissives are not met, the engine will not start. When a specific permissive is met, the associated indicator on the display screen will be GREEN. [Encl (20), (22), (40); ref (e)]

45. Between 1355 and 1421, (b)(6) and (b)(7)(C) requ ission to start #1 and #2 MPDEs in accordanc #1. (b)(6) and (b)(7)(C) ensured the

MPDE start permissives on MPCMS were GREEN ave [redacted] permission to start the MPDEs IAW LOP #1. [redacted] did t the permissives for CG operations although n the same MPCMS page. [Encl (20), (22), (40)]

- Crew 101 used LOP #1 (undated) to start #1 and #2 MPDEs locally because they were unaware an EOSS procedure existed for this procedure. EOSS procedure CMPDE was updated in September 2014. [Encl (20), (22), (39), (41), (42)]

- LOP #1 is the same procedure Crew 101 used while training on FRE. [Encl (20), (22), (41), (42)]

- [redacted] knew that he was required to use and follow LOP #1 ng MPDEs locally. [Encl (22)]

Note: START MPDE LOCALLY is categorized as an "Infrequent Task" in the Littoral Combat Ship Training Manual. [Ref (c)]

46. The start permissives on MPCMS for a remote start of an MPDE at the RCO station in CCS are:

a) Keep Warm System in Remote
b) Engine at Keep Warm Temperature
c) Engine Pre-lubed
d) Barring Gear Not Engaged
e) Fuel Rack at Zero
f) Overspeed Air Pressure
g) No Shutdowns Active
h) Starting Allowed from Engine Controller
i) Fuel Oil Service **
j) Gears are Ready **
k) Water Jets Ready **
l) Air Intake & Exhaust **
m) MPCMS Start PDE OK **

NOTE: Permissives marked with (**) are only required to start MPDEs remotely. [Encl (40)]

[redacted] e [redacted] and a [redacted] representative were in the MMR with [redacted] d ng the light-off on 12 Jan 16, but they wer here to visual checks on the MPDEs and were not supervising [redacted] 's actions at the LECP. [Encl (17), (22)]

48. [redacted] stated he had LOP #1 n and on the controller betwe and STBD LECP The [redacted] verified he saw LOP #1 open on top of the controller when [redacted] was paring to start the MPDEs. [Encl (17), (22)]

49. (b)(6) and (b)(7)(C) stated he ensured the permissives on the LECP for PORT DE local start were all GREEN prior to starting the MPDEs. [Encl (22)]

50. The start permissives for a local start of the MPDEs on the LECP in the MMR are:

a) Keep Warm System in Remote
b) Engine at Keep Warm Temperature
c) Engine Pre-lubed
d) Barring Gear Not Engaged
e) Fuel Rack at Zero
f) Overspeed Air Pressure
g) No Shutdowns Active
h) Starting Allowed from Engine Controller

NOTE 1: "Gears are Ready" is not a permissive to start the MPDEs at the LECP.

NOTE 2: Although "Gears are Ready" is not a permissive for a local start, both the LOP which was ordered to be used and the CMPDE EOSS procedure specifically state to verify Combining and Splitter gear lube oil temperature is between 95F-130F, lube oil pumps are running and lube oil pressure is greater than 25 psi. [Encl (40)-(42)]

51. (b)(6) and (b)(7)(C) did not have LOP #1 or the CMPDE EOSS procedure open in CC (20)]

52. Between 1355 and 21, (b)(6) and (b)(7)(C) attempted to start #2 MPDE but it failed to start. (b)(6) and inv nd found the cause to be an engaged barring devic lthough he stated the start permissive icator on the LECP panel was GREEN indicating it was disengaged. (b)(6) and disengaged the barring device but did not report the cause of the led start to the EDO until after the MPDEs had been started and secured. [Encl (17), (20), (22)]

53. At 1421, (b)(6) and (b)(7)(C) reported starting #2 MPDE IAW LOP #1. [Encl (20), (22), (3

54. At 1422, MPCMS displayed PORT CG (bearing 10P) "Hi", "Hi Clear" and "RTD Data Fault" alarms within 6 seconds of each other. MPCMS data file entries are listed in Zulu time, but have been converted to local time for ease of interpretation in all associated findings of fact. [Encl (43)]

55. At 1425, (b)(6) and (b)(7)(C) reported to the EDO that #2 MPDE leak checks were complete Encl (20), (22), (39)]

56. At 1427, (b)(6) and (b)(7)(C) reported starting #1 MPDE IAW LOP #1. [Encl (20), (22), (3

57. At 1431, MPCMS displayed STBD CG (bearing 10S) "Hi", "Hi Clear" and "RTD Data fault" alarms within 3 seconds of each other. [Encl (43)]

58. At 1433, (b)(6) and (b)(7)(C) logged the start of #1 LOTP to transfer lube oil IAW LOTA.)]

59. At 1435, MPCMS displayed PORT CG (bearing 9P) "Hi" and "Hi Hi" alarms 30 seconds apart. [Encl (43)]

60. At 1435, (b)(6) and (b)(7)(C) reported to the EDO that lube oil samples were obtained PDEs. [Encl (20), (22), (39)]

61. At 1436, MPCMS displayed PORT CG (bearing 15P) "Hi" and "Hi Clear" alarms 19 seconds apart. [Encl (43)]

62. At 1437, (b)(6) and (b)(7)(C) reported stopping #1 and #2 MPDEs locally IAW LOP #1, OP [Encl (39)]

63. At 1438, (b)(6) and (b)(7)(C) made a late entry in the Engineering Log that at 14 oil transfer pump, transferred approximately 48 gal. [Encl (20), (39)]

64. Between 1422 and 1439 MPCMS recorded over 200 events. [Encl (44)]

65. At 1440, the [redacted] stopped #2 FOSP IAW CFOP and secured the service system alignment. ncl (39)]

66. At approximately 1440, (b)(6) and (b)(7)(C) departed the MMR enroute to the Oil Lab to resume his ad e tasks. [Encl (22)]

67. After the MPDEs were secured, between 1438 and 1752, MPCMS displayed numerous bearing related alarm notifications ("Hi Hi Clear", "Hi Clear", "Hi", "Hi Hi", "RTD Data Fault Clear", "RTD Data Fault") on multiple PORT and STBD CG bearings (9P, 10S, 10P). [Encl (43)]

68. Sometime after 1440, after securing the MPDEs, (b)(6) and (b)(7)(C) called up the Alarm Summary Page on MPCMS to review all the had received. Previously he was looking at specific equipment status screens (MPDE Overview, Bearing Overview, Reduction Gear Overview) to monitor MPDE operations and to attempt to determine why he was receiving CG temperature alarms. When monitoring specific equipment status screens, only 4 lines of the most recent alerts (alarms, status changes, etc.) are displayed on the bottom of the screen at a time. [Encl (20)]

69. Sometime after 1440, the [redacted] asked (b)(6) and (b)(7)(C) to investigate the PORT CG bearing 10P cannon plu o deter ause of the associated high temperature alarm. [Encl (20)]

70. Sometime after 1440, (b)(6) and (b)(7)(C) entered CCS and noticed the high CG mperature alarms and STBD CGs and discussed with (b)(6) and (b)(7)(C). [Encl (20), (ime after 1440, (b)(6) and (b)(7)(C) went to the MMR to review LOP #1 to gather more information ab CG lube oil system as related to MPDE operation. [Encl (18), (20)]

72. Sometime between 1440 and 1541, (b)(6) and (b)(7)(C) troubleshot the 10P bearing cannon pl f . CCS and i (b)(6) and (b)(7)(C) (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) . (b)(6) and (b)(7)(C) recalled (b)(6) and (b)(7)(C) c g was ty. 4), (18), (20

73. (b)(6) and (b)(7)(C) reported that he was summoned nutes after c he MPDEs and was then told by (b)(6) and (b)(7)(C)) that he had run the CGs without lube oil. [En

74. At 1541, (b)(6) and (b)(7)(C) entered in the Engineering Log "Upon starting PORT owed an alarm to radial bearing 10P of 196.30 deg F at 1457. Chief Engineer notified. The cause was faulty cannon plug, determined by S/F. Clutches not engaged, no rotation on shafts, local temps at 100 deg F." [Encl (20), (39)]

75. (b)(6) (b)(6) and (b) reported he focused on the #10P bearing because there had b a ious issue with the cannon plug for that bearing. Additionally, he thought the bearing alarms may be the result of a circuit card that had been changed out earlier in the week to correct bearing alarm set points and was not yet functional. [Encl (20)]

76. Around 1800 on 12 Jan 16, the (b)(6) and (b)(7)(C) notified the CO about the potential damage to the CGs. Later evening, the CO notified DESRON 7 and LCSRON 1 Commodores. [Encl (8), (14), (33), (45)]

77. Between 1859 and 2141 on 12 Jan 16, the engineers aligned and started the PORT and STBD CGs vent fog precipitators, ELOPs and the CG keep warm system to conduct casualty oil sampling. [Encl (39)]

78. At 2216, (b)(6) and (b)(7) (b)(6) and (b) was relieved as (b)(6) by (b)(6) and (b)(7)(C) by order of the XO. [Encl), (39), (46)]

79. At 0040 on 13 Jan 16, engineers tagged out the PORT and STBD MPDEs, both Gas Turbine Engines, and the associated turning gears to conduct a CG inspection. [Encl (39)]

80. On 15 Jan 16, sight flow indicators for #9S and #10S journal bearings on the STBD CG were removed and found to be full of babbitt. Babbitt was also noticed in the sight flow indicators for #11P, #12P, and #13P journal bearings on the PORT side. [Encl (40)]

81. In the hours preceding the casualty, the Engineering Log indicated a lot of activity including multiple SSDG starts and stops; transfer of potable water, lube oi d ; pumping down VCHT; fuel system checks and tag-outs. (b)(6) (b)(6) and (b) (b)(6) and (b)(7)(C) stated to the Preliminary Inquiry Officer (PIO) e many things taking up his attention on 12 Jan 2016 and he could not focus 100% of his attention on any one item." During this investigation he stated he was busy, but was not feeling overwhelmed. [Encl (20), (22), (39), (47)]

82. Crewmembers expressed being exhausted and under heavy workloads, with several competing demands for their attention, in the days leading up to the CG casualty. [Encl (8), (11), (14), (20, (22), (48)]

83. Besides being tasked with ly testing the ship's MPDEs on the afternoon of 12 Jan 16, (b)(6) and (b)(7)(C) was not directly given any additional tasks that would hav d with his ability to focus attentively on the MPDE testing. [Encl (22)]

84. Neither (b)(6) and (b)(7)(C) nor (b)(6) and (b)(7)(C) recall having specifically discussed set ligni ating the CG lube oil system before proceeding with the MPDE light-off. [Encl (20), (22)]

85. Normally the ship's CG lube oil system is already aligned before attempting to start MPDEs (when the ship is underway or auxiliary steaming). Crew 101 was therefore not experienced with starting MPDEs in a cold iron condition. [Encl (20), (22)]

86. (b)(6) and (b)(7)(C) initially claimed to have seen readings on the Local Gears orresponded to sat actory CG lube oil pressure, temperature, and pump operation. (b)(6) and stated he thinks he saw SAT readings because he was going thro the procedure quickly and the data may not have had time to refresh. Additionally, he stated he may have mistaken the lube oil pump to be ON because the "Lube Oil Pump Off" indication is GREEN in color. [Encl (22)]

- NSWCPD Code 512 (MPCMS ISEA) reported they have not been informed of any issues with the refresh rate on the gears HMI. However, during a recent visit to FTW, the ISEA noticed a longer than normal delay on the Alarm Table updating but ONLY when the HMI application is restarted. Additionally, checks conducted on FRE, performed by the ISEA showed no delay of information while navigating screens. [Encl (24), (49)]

- The "Lube Oil Pump Off" indication on the HMI individual gear screen is GREEN in color but is located to the far left of the "Lube Oil Pump Armed", "Lube Oil Pump Slow" and "Lube Oil Pump Fast" indications. The Lube Oil pump "Off" indication on the HMI combined gear display is GREY. [Encl (49)]

87. During a follow up interview with [redacted] he admitted that he rushed through the HMI screens and m n actually looked at the d l ely. [Encl (22)]
88. [redacted] reported he performed LOP #1 simultaneously for #1 and # p ncl (22)]

89. After starting #2 MPDE, [redacted] needed to reset #2 MPAC to get sufficient air pressure t t MPDE due to an existing condition with the condensate drains backing up. [Encl (20), (22)]

90. [redacted] stated that he felt rushed by the [redacted], to pl onal testing of the MPDE a nt. [redacted] did not communi concern to [redacted] or anyone in his in of [redacted] stated he n to the space, not to rush [redacted], et a status of testing after the MPDEs were alr d. [Encl (20), (22)]

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

91. During MPDE operations, OCULUS, the LCS autonomous monitoring and near real-time data collection system for operational systems and lifetime recording, recorded the following CG bearing temperatures:

Port and Starboard CG Bearing Temperature Log Readings from OCULUS							
Time	Port CG 9P	Port CG 10P	Port CG 15P	Time	Stbd CG 9S	Stbd CG 10S	Stbd CG 15S
"Hi" Alarm	171 deg	188 deg	168 deg		175 deg	185 deg	173 deg
"Hi Hi" Alarm	180 deg	197 deg	177 deg		184 deg	194 deg	182 deg
14:20:07			92.8	14:26:17			93.3
14:21:00		93.3	102.7	14:27:07			100
14:22:00		100.3	107.9	14:29:28		96	110.2
14:22:23		111.5	109.7	14:29:58		100.6	111.7
14:22:29		124.7	110.1	14:30:30		111.1	113.4
14:22:31		132	110.2	14:31:01		121.2	114.5
14:22:32		151.4	110.4	14:31:34		130.2	115.9
14:22:36		176.3	110.8	14:31:47		143.8	116.4
14:22:39		184.1	110.8	14:31:50		151.7	116.5
14:22:40		192.2	110.9	14:31:51		166.7	116.6
14:22:41		200.7	111	14:31:52		**264**	
14:22:43		210.1	111.1	14:33:20	98.9		120
14:22:45		224	111.2	14:36:24	110.4		126.5
14:22:46		261.7	111.5	14:36:26			**126.6**
14:22:48		**264.1**	111.5	14:36:35	**111.5**		
14:28:06			120				
14:28:59	98.1		125.4				
14:29:32	100.3		129.1				
14:31:38	110.1		134.7				
14:32:28	121		138.8				
14:33:04	130.3		144				
14:33:45	140.6		148.2		Note 1: The OCULUS times listed have been converted to match local time and account for a minor time difference between OCULUS and MPCMS.		
14:34:12	150.1		152.9				
14:34:35	160		155.9				
14:35:00	170.9		159.4				
14:35:22	180.7		161.1				
14:35:51	191.7		163.8				
14:36:18	201.3		166		Note 2: The highest temperature reached on each bearing is listed in **bold** font.		
14:36:38			**169.4**				
14:36:48	211.2		167				
14:36:53	**212.8**		165.1				

[Encl (50), (51)]

92. Despite receiving numerou earing alarms ("hi" and "hi hi" temperature indications), (b)(6) and (b)(7)(C) did not take immediate and controlling actions in accorda OCC procedure MHBRG. [Encl (20), (39)]

93. There is a terminology difference between MPCMS and EOCC, which may lead to confusion. While MPCMS shows an uncontrollable bearing temperature condition as "hi hi," MHBRG refers to this condition as "very high." [Encl (28), (43)]

94. After receiving the hot bearing alarms, (b)(6) and (b)(7)(C) looked at the CG display on MPCMS to check if the shafts we g, the clutches were engaged or if the lube oil temperatures were high. He stated he observed the shafts were not rotating, the clutches were not engaged and the lube oil temperatures were at 100 degrees. This action was logged as a late entry at 1541. [Encl (20), (39)]

95. On the LCS FREEDOM variant, while the MPDE is running without clutches engaged, the MPDE input shaft turns the two diesel engine high speed reduction gears inside the CG. [Encl (40), (52)]

96. CO, (b)(6) and (b)(7)(C), and (b)(6) and (b)(7)(C) each claim they had no prior knowledge MPDE i rotated inside the CG when clutches were disengaged. Neither the POG nor the ARTEC Reduction Gear Training Guide provided to crew members during T2Q vendor training makes mention of this fact. [Encl (8), (14), (17), (20), (22); (ref (e), (f)]

97. Since (b)(6) and (b)(7)(C) was unaware the MPDE input shaft turned inside the CG with disengaged, he did not think to check if the CG Lube Oil pumps were on when he received the bearing alarms. [Encl (20)]

98. (b)(6) and (b)(7)(C) never informed (b)(6) and (b)(7)(C) he received hot bearing alarm ORT and STBD CGs MPDEs were in operation. [Encl (20), (22)]

(b)(6) and (b)(7)(C) did not promptly notify the CO, XO, (b)(6) and (b)(7)(C) or (b)(6) and (b)(7)(C) ed hot bearing alarms until well afte s we ed. [Encl (8), (11), (14), (17), (18), (20)]

100. (b)(6) and (b)(7)(C) wrongly attributed the high temperature alarms receiv MS to a faulty cannon plug and recently updated bearing alarm set points. This was due to his previous experience with a faulty nnon plug causing a high bearing temperature alarm while he was (b)(6) and underway and high bearing temperature alarms FTW experienced w h were later attributed to improper set points. [Encl (20), (24)]

- NAVSEA corrected FTW's improper bearing temperature set points on 09 Jan 15. [Encl (53)]

- (b)(6) and (b)(7)(C) reported there have been numerous sensor problems with p's Service Diesel Generators (SSDGs) but no significant problems with the CGs. [Encl (46)]

101. (b)(6) and (b)(7)(C) stated he was confused by the rapid succession of high t alarms on the MPCMS display console in CCS. During the MPDE testing, he noticed several hot bearing alarms but did not acknowledge them on the screen so that he could review them later on the Alarm Summary page. While the alarms were coming in, he stated he was switching between MPDE Overview, Bearing Overview CG and Reduction Gear Overview status displays on the three MPCMS monitors to determine a possible cause of the alarms. He did not hear the alarms because the MPCMS alarm volume was turned down to the point of being inaudible. [Encl (20)]

102. (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) each estimate they had gotten approx 6 hou errupted sleep the night before the casualty. Each stated they stayed up late to communicate with family in the United States and not because of ship related tasking. Each stated the amount of sleep they got was adequate and they were not fatigued at the time of the casualty. [Encl (20), (22)]

OTHER CONSIDERATIONS

In an attempt to determine why two experienced senior engineers did not follow clearly written procedures as directed, we looked into what other possible factors could have influenced their actions. Potential factors included inadequate preparation (training, certification, turnover process), excessive workload (demanding schedule, pressure to meet operational requirements, inadequate maintenance support), poor command climate/culture, lack of ownership, disengaged leadership (communications, experience, involvement).

CREW 101 Training/Certifications:

TRAINING

103. In order to expedite arrival to the command and support crew milestones, several of Crew 101's senior enlisted leaders did not complete the full training track they were originally scheduled to attend. The following Engineering specific courses were not attended:

- (b)(6) and (b)(7)(C) - MPCMS
- (b)(6) and (b)(7)(C) - Reduction Gears, Repair Party Leader and Cathodic
- (b)(6) and (b)(7)(C) - all Electrical courses of instruction

- (b)(6) and (b)(7)(C) - Reduction Gears

[Encl (20), (46), (54), (55)]

104. The POG is a robust source of supplementary technical information for training, qualification preparations, and quick reference. POGs are used as a guide during formal courses of engineering instruction for LCS Sailors of every rank. POGs only exist, however, for FRE and have not been updated since 2013. [Ref (e)]

105. Neither the POG nor the ARTEC Reduction Gear Training Guide provided to crew members during T2Q vendor training specifically states that the MPDE input shaft rotates inside the CG when clutches are disengaged. Additionally, there are no specific warnings in LOP #1 or EOSS procedure CMPDE that address this concern. [Encl (41, (42); ref (e), (f)]

CERTIFICATIONS

106. LCSRON ONE's N4 and N7 Directorates and ATGPAC were responsible for training and preparing Crew 101 for their various certification events. [Ref (b)]

107. LCS Training Manual states that during the LCS Training Facility (LTF) portion of the off-hull training period, LTF staff integrates with the LCSRON Engineering Training Team (ETT) for scenario-based training conducted at the facility. [Ref (c)]

- Because LCS is relatively new, training developers have had to balance competing sets of short and long term requirements. As such, with the exception of the RCO, no virtual-reality shore-based training facility exists to train LCS engineers on how to perform their jobs in an operational environment. In other words, current training facilities do not have the ability to integrate the EPT into scenario-driven EOCC training events. An avatar trainer is in development and is expected to be on line at the LTF building in San Diego in September 2016. [Encl (31), (33), (56); ref (b)]

108. A host of external support personnel are employed to assist each crew in preparing for and in executing its EOC (e.g., achieving Safe-to-Train/Safe-to-Operate [STT/STO]). This notionally includes dozens of Sailors from off-hull crews, LCSRON ONE (including formal Training Teams from LCSRON ONE N7), ATGPAC, and Reserve Detachments. This was also the case for each of Crew 101's EOC events. [Encl (31)]

109. LCS crews have historically required multiple attempts to complete EOC as follows:

- Crew 104 required 2 attempts

- Crew 103 required 3 attempts
- Crew 102 required 3 attempts
- Crew 101 required 5 attempts

[Encl (57)]

110. Crew 101 required five attempts to achieve a conditional EOC between 20 May 15 and 14 Jun 15. [Encl (8), (11), (33), (57), (58)]

111. Docking of FRE was delayed in order to provide the additional opportunities for Crew 101 to certify. [Encl (31), (33)]

112. Engineering Assessments Pacific (EAP) was the certifying organization for each of Crew 101's EOC attempts. [Encl (58)]

113. Crew 101's engineers believe some of the struggles they had completing EOC could be attributable to the focus EAP placed on FRE's material condition. The large amount of time spent fixing gear and achieving STT/STO conditions stressed the crew prior to their operational assessments. [Encl (14), (20), (22), (31), (33)]

- Unit-level crew certification is designed to "provide a clear means of executing crew training and certification as separate events from administrative checks and material checks" and "account for mixed ownership of administrative requirements, programs, material readiness and logistics support amongst the crews, LCSRON ONE, ATGPAC and other organizations." [Ref (b)]

- EAP conducted EOCs on LCS crews, including 101, in the same manner it had assessed traditional warships without full regard for the unique characteristics of crew/ship rotations in accordance with LCS CONOPS. LCS EOC is an operational certification and not a material assessment (per LCS CONOPS) as it would be for other platforms. [Encl (31), (33); ref (b)]

114. LCSRON [redacted] attributed Crew 101's struggles through EOC to lack of watchstander [redacted]itiative and inability to adhere to basic watchstander principles. [Encl (31)]

115. On the fifth attempt, Crew 101 was recommended for Conditional Certification with full certification held in abeyance contingent on Crew 101 meeting CE03 (Jacket Water Program) and CE04 (Tag-Out Program) minimum standards. Additionally, based on the piecemeal nature of their certification, EAP recommended Crew 101 conduct remedial evolution and drill training under supervision of LCSRON ONE or ATGPAC trainers on an operational LCS 1 FREEDOM Variant hull prior to executing their next crew swap to a forward deployed hull. [Encl (31), (33), (58)]

- Since FRE was in an extended availability, there was no operational LCS 1 Variant hull available stateside to conduct remedial evolutions/drills prior to the crew's deployment. [Encl (11), (31)]

- Crew 101 sent two engineering watch teams to FTW prior to deployment to conduct evolution and drill training and space familiarization. No LCSRON ONE or ATGPAC trainer accompanied them. [Encl (11), (20), (31), (33)]

- At the time of the casualty, Crew 101 had yet to achieve fu MOB-E certification. On his 06-14 Jan 15 visit, LCSRON ONE [redacted] assessed CE03 (Jacket Water Program) as Partially Effective CE04 (Tag-Out Program) as Not Effective. [Encl (31), (32)]

116. The previous [redacted] was one of the RCOs during the EOC but transferred prior t[redacted]1's deployment. Nominally, IAW the LCS CONOPS, all personnel transfers should take place during the first three weeks of the off-hull period to allow time for turnover prior to the start of the Rapid Refresh period/crew certification events. [Encl (14), (18); ref (b)]

117. Both, the DESRON 7 [redacted] and LCSRON ONE [redacted] consider the Crew 101 team of engineers as the [redacted]akest of the fou[redacted] engineering crews that have sailed FTW during her current deployment. [Encl (31), (33), (34), (45), (59)]

118. DESRON 7 was never formally told by LCSRON ONE that Crew 101 required five attempts to pass its EOC. [Encl (34), (45), (59)]

119. IAW the LCS Training Manual, ATGPAC will evaluate each LCSRON ONE Engineering Training Team (ETT) every two years and provide a Training Team Certification recommendation to the TYCOM. The LCSRON ETT has yet to be certified because ATGPAC is still developing the plan on how to accomplish the assessment. [Encl (31); ref (c)]

120. Crew 101 completed its Independent Deployer Certification Exercise (IDCERTEX) with Carrier Strike Group Fifteen (CSG15) on 15 June 15. However, the certification message stated, "since the IDCERTEX preceded Crew 101's deployment by more than 120 days, CSG 15 will conduct a sustainment event with the deploying crew." The crew's follow-on SUSTEX was completed in LCSRON ONE's LTF in September 2015. [Encl (8), (11), (33)]

121. The requirement to complete a SUSTEX weeks before their deployment complicated Crew 101's ability to thoroughly prepare for their deployment. The Crew 101 team did not perform to standards on the first SUSTEX. The CO and XO attribute this to unclear guidance, late notification and trainer unavailability prior to the event. Additionally, they were simultaneously attempting to prepare to deploy

and conduct FRE Exchange of Command with Crew 111. The second attempt at SUSTEX was successful and the crew reported the training/experience they received was invaluable. [Encl (8), (11)]

122. Despite the challenges in certifying, LCSRON ONE's Commodore, [redacted] and [redacted] each stated they were confident Crew 101 was prepared to depl to F[redacted]. [Encl (31), (33)]

EXCHANGE OF COMMAND

123. Crew 101 conducted a turnover of FTW with Crew 102 in early November 2015, executing an Exchange of Command during which Crew 101 assumed control of the ship on 09 Nov 15. [Encl (2), (25)]

124. The LCSRON ONE Exchange of Command instruction does not specifically require a detailed review of applicable LOPs/EOSS. [Ref (g)]

125. Every Crew 101 engineer interviewed stated that the time allocated for crew turnover of FTW was insufficient to adequately assess the condition of the engineering plant. [Encl (14), (18), (20), (22), (48)]

126. Multiple crew members expressed concern with the condition of the spaces at turnover. [Encl (11), (14), (48)]

127. [redacted] was dismayed by the poor material condition of FTW's engine[redacted] plant during the turnover period, stating "it was FREEDOM all over again." Others believed the turnover was going to happen regardless of any protests they might make. [Encl (8), (11), (14), (48)]

128. The Exchange of Command letter documenting the turnover of FTW from Crew 102 to Crew 101 makes no significant mention of the ship's engineering space material condition, cleanliness or readiness. [Encl (25)]

129. IAW the Exchange of Command instruction, LCSRON ONE N7 shall maintain a list of differences between different hulls and provide training to on-coming crews prior to the turnover period. No formal differences training was conducted for Crew 101, and no lists of hull differences currently exist. [Encl (31), Ref (g)]

130. Neither LCSRON ONE nor DESRON 7 is involved with material assessments during Exchange of Command. [Encl (31), (34)]

131. DESRON 7 [redacted] has never been involved with assessing or coordinating as[redacted]ssments of FTW's material condition. His involvement in crew turnovers to date has focused primarily on coordinating in-

bound crew's logistics (e.g., customs, ground transportation, manning lists, lodging). [Encl (34)]

132. There is some inconsistency of divisional compartment assignments between FRE and FTW, creating challenges during the turnover process. [Encl (13), (48)]

133. Crew Turnover did not include an underway demonstration as described in the Exchange of Command instruction. FTW got underway for a 2-hour transit from Changi to Sembawang in a restricted maneuvering condition. The instruction recommends, at a minimum, a full power demonstration to include various propulsion plant configurations, waterjet swing checks, production of potable water, and launch, operation, and recovery of ship's RHIBs. [Encl (8), (11), (14); ref (g)]

External Support

134. A LCSRON [redacted] material assessment conducted from 06-14 Jan 16 revealed a large number of material discrepancies, many of which were not previously entered in the CSMP. Attempting to correct this list of discrepancies prior to getting underway placed additional stress and negatively impacted morale of the FTW engineers. [Encl (11), (13), (14), (18), (20), (32)]

135. The engineers interviewed stated that although they were surprised and frustrated by the long list of discrepancies reported by LCSRON ONE [redacted] they thought the list was fair and accurate. They said that if such assessments had been occurring with greater regularity during the last year, external resources would have been more aggressively leveraged to maintain FTW's engineering plant in a satisfactory state of readiness. [Encl (8), (11), (14), (20)]

136. FTW's material condition deteriorated since its arrival in theater. This was at least partially attributable to her having been "ridden hard" to satisfy aggressive operational commitments and lack of external material assessment support. [Encl (13), (11), (14), (34)]

137. LCS crews only have access to a small number of hard copy equipment technical manuals on board due to weight restrictions and storage capacity. Applicable technical manuals are available electronically on ATIS via NIAPS. These are not readily accessible for use in troubleshooting inside engineering spaces. [Encl (11), (14), (22)]

138. Since chopping to C7F on 04 Dec 14, FTW has executed four 2-week RAVs. DESRON 7 [redacted] believes that a large RAV should occur at the half-way (notionally mid-month) point of a LCS hull's deployment to address steadily worsening maintenance issues. In FTW's case, a longer RAV

could have focused on improving SSDG reliability. [Encl (4), (5), (34)]

139. Since deploying in November 2014, FTW has only missed one scheduled maintenance period. This was a January 2015 concurrent PMAV/RAV, which it missed in order to assist with the search/recovery operations following the Air Asia flight disaster. [Encl (5), (11), (45)]

140. Based on lessons learned through FRE's deployment in 2013, it was determined that there would be significant benefits gained in permanently assigning Sailors overseas in Singapore as part of a Forward Logistics Element (FLE) in support of future LCS deployments in the SEVENTH Fleet AOR. [Encl (60)]

141. On 10 Oct 14, DESRON 7 and LCSRON ONE signed a Memorandum of Understanding (MOU) reassigning eight (predominantly engineering CPO) FLE billets from LCSRON ONE to DESRON 7 in support of FTW's deployment. The primary task of the FLE personnel is to coordinate local logistics and material readiness efforts between the ship and all other organizations in support of the ship meeting operational commitments. In addition, the FLE is to execute material assessments to support maintaining an accurate assessment of the readiness of deployed LCS ships. [Encl (61)]

142. Originally the FLE included an OIC, but this billet was disestablished and re onsibility was transferred to the DESRON 7 [redacted] Because the DESRON 7 [redacted] has competing operational responsibilities e is un e to focus hi efforts as much as the FLE OIC did previously. CLWP [redacted] stated this billet was critical to the success of the FLE effec eness in coordinating maintenance and is not as effective now as it used to be when LCSRON ONE managed the program. [Encl (5), (33), (34), (61)]

143. CLWP [redacted] and DESRON 7 [redacted] assert the effectiveness of FTW maintenance anning has bee negatively impacted by Crew 101 not writing/processing jobs expeditiously and DESRON 7 FLE inexperience. [Encl (5), (11), (14), (34)]

144. Crew 101 engineers expressed a feeling that the DESRON 7 FLE team was not especially helpful or proactive. They would help the crew to check a job and part status, but were rarely on the ship and did not help the ship conduct material assessments. [Encl (8), (11), (14), (17), (20), (22)]

145. The FTW Port Engineer (PE) is based in San Diego. She is also dual assigned as the PE for FRE, which is executing a demanding CNO availability. Besides communication challenges as a result of the significant time zone difference, being "offsite" prevents the PE from being able to personally validate maintenance requirements, conduct

ship checks to determine scope of repairs and verify work accomplishment. [Encl (6)]

146. The [redacted], [redacted], [redacted], XO, and [redacted] all remarked the non-standard maintenance process adopted to get work accomplished has proven to be cumbersome and time consuming, and impacts timely repairs. [Encl (5), (6), (11), (14), (34)]

147. Duke Marine Engineering Consultants (DMEC) personnel are contracted by Lockheed Martin to embark LCS hulls, providing technical expertise and maintenance assistance to Engineering Department Sailors. DMEC riders have been assigned to ride FTW to assist the hull crews continuously since the ship deployed in late 2014. The contract enabling DMEC engineers to assist LCS crews aboard ships is set to terminate in May 2016 with no identified replacement assets. These skilled technicians offset lack of crew capability due to minimum manpower. CLWP [redacted] believes crews do not have the knowledge base, resources and experience to keep the engineering plant running properly without the assistance of DMEC. [Encl (5), (8), (11), (34)]

148. CLWP's [redacted] stated he was satisfied with the quality of repair and preventive maintenance performed by contractors in theater. [Encl (5)]

COMMAND CLIMATE/CULTURE

149. Results of the July 2015 Defense Equal Opportunity Management Institute (DEOMI) Organizational Climate Survey revealed a number of areas of concern for Crew 101 including: Job Satisfaction, Exhaustion, Command Communication, and Trust in Leadership. [Encl (62)]

- This climate assessment occurred immediately after the crew's multiple attempts at engineering certification and while the ship was in a drydock availability. [Encl (33)]

- Of particular concern were the job satisfaction and exhaustion scores, which the LCSRON ONE Commodore said is consistent amongst LCS crews. [Encl (33)]

- Two areas looked at in an informal command climate survey and interviews administered by the investigation team revealed continuing concerns with Exhaustion and Command Communication. [Encl (48)]

- Because of the high OPTEMPO, numerous demands placed on the ship, and seemingly endless workload, 9 out of 10 enlisted Sailors and half of the Officers surveyed said they felt overwhelmed. [Encl (48)]

150. [redacted] stated that every new issue threw him and his Sailors out of the [redacted]ttle rhythm because there was not enough manpower to support additional tasking. Planned watchstander training events were frequently cancelled because of emergent equipment casualties and special evolutions like flight quarters and helicopter refueling. [Encl (14)]

151. A LCSRON [redacted] visit the week prior to the incident identified numerous exampl[redacted]f spaces and equipment below standards, particularly in hot areas (Engineering, AMZ, etc.). [Encl (11), (14), (31), (33)]

152. [redacted] stated that standards are extremely hard to maintain on FTW an[redacted]w 101 may have been neglecting standards to meet mission. In a comment made during an informal command climate survey, a Sailor stated there was "no break, no reprieve, just increasing daily tasking." [Encl (14), (48)]

153. The crew overwhelmingly expressed a feeling of ownership of FTW and they want to turn it over better than they received it, but also think their efforts may be wasted because any progress they make will not be maintained by follow on crews. [Encl (20), (48)]

154. LCS Crew 101 conducted training on the watchstander's guide in accordance with CNSP direction. Hard copies are not available for the crew, but they have access to the guide electronically. [Encl (10), (63)]

155. In October 2015, CO held training on the CNSP procedural compliance message in groups to include Chiefs and Officers, E-6, and E-5 and below. [Encl (33), (36)]

156. Every engineer interviewed reported [redacted] stresses procedural compliance at every morning quarters and o[redacted] evening of 11 Jan 16, he mustered the department to specifically address slowing things down and procedural compliance because he was concerned they were rushing to meet operational commitments. [Encl (14), (17), (18), (20), (22)]

157. [redacted] reported recommending to the CO he needed to delay two previo[redacted]heduled underway periods because additional time was required to complete mate[redacted] repairs, and the CO was supportive in that he did not pressure [redacted] to expedite the work. [Encl (14)]

158. During the investigation team's informal command climate survey, the majority of the crew agreed that procedural compliance is a priority at the command, however, some Sailors felt the pace of operations may diminish strict adherence. [Encl (48)]

159. The Tag-[redacted] program was re-assessed once again as not effective by LCSRON ONE [redacted] in Jan 16 primarily due to a failure to conduct

independent second checks. During LCSRON ONE [redacted] assessment, the team lead observed S/F and contractors all wal[redacted] around Aux #2 together hanging danger tags and signing first, second and Repair Activity on danger tags, line item record sheet and the tags to be hung sheet. [Encl (8), (11), (32)]

2015, [redacted] and the previous [redacted] received [redacted] for n[redacted]gging-out a piece [redacted]ent before [redacted]nance. On 11 Jun 15, t[redacted]y after fai[redacted]r attempt, CREW 101 engineers ([redacted], previous [redacted], [redacted] and a DMEC representative) co[redacted]ed an open [redacted]ct on [redacted]il Purif[redacted]OP) because of a low RPM fault without tagging out the equipment [redacted] received [redacted]ission from the CO). At some point during the t[redacted]shooting [redacted] left the space. Upon opening the cover, the clutch plates fell[redacted] and the cause was determined to [redacted]rn clutch plates. The engineers showed the faulty components to [redacted] and the CO, obtained n[redacted]rts and r[redacted]he casualty without [redacted]ng out the equipment. [redacted] and the [redacted] had received permission to open and inspe[redacted]e equipme[redacted]ot to repair. A PI referred to perceived pressure to get the FOP operational for a planned 4-hour full power run. [Encl (8), (11), (64)]

161. Crew 101's Engineer Officer's Standing Orders (dated 13 Dec 15) are up to date and signed by the command's current CO. They include the following applicable excerpts:

- "**VERBATIM COMPLIANCE:** Adherence to all procedures is MANDATORY. Always use EOSS, MRCs, LOPs, and/or other technical documentation. No matter how experienced or familiar personnel may be with equipment, scrupulous adherence to written procedures eliminates human error and avoids damage and safety hazards."

- "**NEVER IGNORE INDICATIONS:** If it doesn't look, sound, or smell just right, investigate. Do not ignore or acknowledge an alarm without thoroughly investigating the cause."

[Encl (65)]

162. Crew 101's CO Standing Orders (dated 21 Oct 15) are up to date and signed by the command's current CO. They do not specifically address procedural compliance but do state under "Required reports and actions requiring my permission":

- "Deviation from any EOSS procedure or written directive"

[Encl (66)]

163. Although the CO provides daily updates to DESRON 7 leadership, the Commodore feels the reports are often inadequate. CDR Atwell's chain of command had the following comments:

- DESRON 7 CDRE: "The CO seems to pump whatever he is told up to me. For ex were dealing with SSDG issues before this CG event. (b)(6) and (b)(7)(C) and I talked about letting the CO know that we can (b) delays underway to get more parts on board and be ready. He came back and said that they would be fine to get underway on time. The next day, he had leaks on SSDGs everywhere and it was like the sky was falling."

- DESRON 7 DCDRE: "I think, a lot of times, there is a lack of confidence or conviction in things he says or how he says them so you have to ask him if he is asking you or giving you an answer."

[Encl (45), (59)]

NE and DESRON 7 and (b)(6) and (b)(7)(C) to the FTW CO (b)(6) and (b)(7)(C) e they believed erience. Before the casualty, the LCSRON ONE Commodore planned to ride the ship to assess the CO's performance and issue an LOI. [Encl (33), (45)]

165. CLWP (b)(6) and and DESRON 7 (b)(6) a concur that the ship is not sufficientl ommunicating t ir concerns about ial condition or requesting outside assistance. They also agree (b)(6) and (b)(7)(C) is more involved in deckplate maintenance than overall department gement. [Encl (5), (34)]

166. The XO reports the (b)(6) and (b)(7)(C) is the best he's ever seen and, despite the s icant challenge esn't have quit in him". XO reported that (b)(6) and (b)(7)(C) regularly expressed his frustrations but never asked for assis , saying that he would get it done. [Encl (11)]

167. Command-wide Tiger Teams were not used by Crew 101 to assist engineers in keeping spaces up to standards until the LCSRON ONE Commodore's visit necessitated it. [Encl (8), (11)]

168. In an informal command climate survey, feelings about the flow of communications up and down the chain of command were mixed. The CO's suggestion box is often full. [Encl (8), (13), (48)]

Damages

169. The extent of the damage to FTW's PORT and STBD CGs is unknown as of the writing of this CI, pending equipment inspection by technical community representatives. Current estimates place FTW out of service for 10-14 months. [Encl (67)]

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

Opinions

1. The principal cause of the PORT and STBD combining gear casualties was a clear failure to follow written procedure. I believe, however, a number of cumulative internal and external factors contributed to an overall unhealthy engineering department culture/climate. Leadership, fatigue, frustration, lack of experience, and sub-optimal utilization of external support were evident. Taken alone, none of these factors was considered egregious enough to cause a catastrophic incident, however, the confluence of factors, taken together, created the necessary conditions. In my opinion, there was no malicious intent or lack of effort on anyone's part. It is expected to discover gaps and seams with any new program. Recognizing this fact, everyone interviewed, whether ship's company, ISICs, or external support organizations, seemed genuinely sincere in their determination and desire to want to help Crew 101 and FTW succeed. [FF (1)-(168)]

2. The procedures in place, whether FTW watchstanders used LOP #1 or the CMPDE EOSS procedure, were adequate to prevent the damage from occurring on the PORT and STBD CGs if followed.

- The only significant differences between LOP #1 and CMPDE are:
  - CMPDE lists separately all MPDE local start permissives which are displayed on the LECP and adds to ensure "fuel pump started, head tank aligned". LOP #1 only directs to verify "All permissive requirements are met and indicate green with no alarm conditions". The head tank alignment is not addressed.
  - CMPDE directs the watchstander to "request permission" before taking LOCAL control and before starting the MPDE. LOP #1 directs the watchstander to "place" the LOCOP in LOCAL and "notify" the RCO prior to starting.

[FF (15), (18), (44)-(46), (48)-(53), (56), (62), (71), (86), (87), (90), (92), (95)-(98), (101)]

3. (b)(6) and (b)(7)(C) did not practice procedural compliance by inadequately foll teps of LOP #1. His lack of procedural compliance can be attributed to:

- Overconfidenc he had started the MPDEs numerous times in the past, (b)(6) and (b)(7)(C) relied too heavily on muscle memory, not actually read ing and complying with the written procedure available to him. Seeing all MPDE start permissive items displayed as GREEN on the LECP gave him a false sense the system was aligned correctly.

- Sense of urgency. Although [redacted] had admittedly been instructed numerous times by his chain command to take the time necessary to follow procedures, he felt pressure to complete the task quickly. Besides feeling rushed, he was also eager to finish with the MPDE testing so he could return to the Oil Lab to finish administrative tasks.

- Complacency. Although [redacted] claimed he knew starting the MPDE would create rotat the CG casing, he did not think to ensure the CG L/O system was on-line. Normally, when the crew starts a MPDE, the CG L/O system is already on-line to support operations. When conducting MLOCs prior to getting underway, the CG L/O system start precedes starting MPDEs by 6 hours. While underway, the CG L/O system is always lined up for operations.

[FF (15), (16), (18), (45), (48), (81)-(83), (85)-(88), (98), (102), (134), (152)]

4. [redacted] was familiar with the immediate and controllin ctions in t ocedure. While underway and on watch as [redacted] on 16 Dec 2015, [redacted] demonstrated competence and reacted corr tly to a CG hot b ication. The cause of the hot bearing indication in that case was determined to be a faulty cannon plug. [FF (13), (14), (18), (74), (75)]

5. On 12 Jan 16, [redacted] did not take immed ontrolling actions directed i G EOCC procedure. [redacted] could have minimized damages to the PORT CG and eliminated o the STBD CG if he had taken immediate controlling actions upon receiving the first alarm. His lack of action can be attributed to:

- Lack of system knowledge. [redacted] did not understand that starting/operating the MPDE created rotation inside the CG casing. Since he did not see any indication of output shaft rotation or clutch engagement, he did not think MHBRG applied.

- Lack of system knowledge. [redacted] saw the PORT and STBD MPDE start permissives were met the MPCMS console but didn't consider, or look at, the MPCMS permissives on the same page because he knew they would not be engaging clutches. If he had looked, or knew that it was applicable, he would have seen the "Gears are Ready" permissive was not met (GREY). Seeing all MPDE start permissive items displayed as GREEN gave him a false sense the system was aligned correctly.

- Complacency. Due to a previous underway hot bearing alarm condition which was attributed to a faulty cannon plug (active CASREP),the speed in which the alarms came up and cleared/faulted, and NAVSEA having recently completed adjusting

some of the alarm set points, [redacted] was overly eager to recognize the casualty conditi[redacted]ulty indicator.

- Complacency. Normally when the crew starts a MPDE, the CG L/O system is already on-line to support operations. When conducting MLOCs prior to getting underway, the CG L/O system start precedes starting MPDEs by 6 hours. While underway, the CG L/O system is always aligned for operation.

- Overconfidence. [redacted] had full confidence in [redacted] ability to proper[redacted] the task without superv[redacted] had performed this same procedure numerous times previously.

- Overwhelmed. In the hours preceding and during the casualty, the Engineering Log indicates a lot of activity including multiple starts and stops of the SSDG; transfer of potable water, lube oil and oily waste; pumping down VC[redacted]ystem checks and tag-outs which may have distracted [redacted].

- Overwhelmed. When the alarms were going off, [redacted] had the MPDE, PORT CG Bearing Overview and Gear Overvi[redacted]n the MPCMS. He did not call up the alarm summary page until after the MPDEs were secured. Had he brought up the alarm summary page on MPCMS, he would have had a more complete picture of the [redacted] showing the additional alarms that had activated. [redacted] stated the alarm volum[redacted]urned down prior to him watch in violation of [redacted] Standing Orders. Multiple audible alarms could hav[redacted]alerted him he had a more serious situation. Between 1422 and 1439 MPCMS recorded over 200 events.

[FF (13), (14), (15), (16), (18), (54), (57), (59), (61), (67)-(69), (74), (75), (81), (84), (85), (90), (92), (94), (96)-(102), (147)]

6. The CO, [redacted] and [redacted] claim they strive to cultivate a culture of p[redacted]ural [redacted]e by repeating these tenets as priorities to their Sailors at every opportunity. Every Sailor interviewed stated they were constantly being told to take the time necessary to follow procedures regardless of the urgency or pressure to complete tasks. Recognizing the engineers [redacted]e feeling extreme pressure to correct items on the LCSRON ONE [redacted] discrepancy list, close out the [redacted] complete an AVCERT pre-l[redacted]and prepare to get underway, the [redacted] mustered his department the night before the casualty (11 J[redacted]) to specifically stress the importance of procedural compliance. [FF (Background Section), (13)-(16), (18), (23), (92), (94), (98)-(99), (105), (153), (155)-(156), (158), (161), (162)]

7. A contradiction exists, however, between what Crew 101's engineers are told about procedural compliance and what they perceive to be necessary. While they are told almost daily not to rush through tasks and to comply with every procedure verbatim, this guidance does not match the feeling they get of being overwhelmed with work and the need to hurry. This was especially true in the week or so preceding the casualty.

- On 11 Jun 15, the da er failing rt mpt, CREW 101 engineers ([redacted], previous [redacted], [redacted] and a DMEC representative) ucted an op sp Fuel Oil Purifier (ecause of a low RPM fault without tagging out the equipment [redacted] received per on from the CO). At some point during th ubleshooting [redacted] left the space. Upon opening the cover, the clutch pla ell out and the cause was determined to be worn ch plates. The engineers showed the faulty components to [redacted] and the CO, obtained new parts and repaired the casualty out ever tagging out the equipment. A PI referred to perceived pressure to get the FOP operational for a planned 4-hour full power run.

- Crew 101's Tag-Out program was scored as "Not Effective" during their EOC in June and, in the week prior to asualty, was again assessed as "Not Effective" by LCSRON [redacted]

This trend indicates a failure of leadership to effectively get the message across that, barring a wartime environment, safety and procedural compliance trump expedience. [FF (7)-(8), (11)-(12), (13)-(16), (18), (33)-(34), (48), (75), (87), (90), (92), (94), (98)-(99), (101), (107), (150), (152), (158)-(160)]

8. There is also contradiction between Crew 101 engineers and the LCS CONOPS. While the LCS CONOPs states most corrective maintenance will be pe ed by outside (contracted) activities, Crew 101's engineers, from [redacted] down to the deck plates, believe it is their ship and if corre maintenance is within their capability, they should be the ones to fix it. Whether this is due to an admirable "ownership" perspective or lack of understanding of available resources, this mindset effects off-ship communication of material issues and places unnecessary, additional burden on the crew. [FF (Background Section), (18), (30)-(32), (141)-(148), (163), (165)]

9. Crew 101's operational schedule and lack of a training hull adversely affected their ability to conduct remedial engineering training in preparation for deployment. The shipboard equipment was shut down and the crew was supporting contractors during FRE's maintenance availability. [FF (Background Information), (20)-(22), (24)-(25), (27), (107), (113), (115), (120)-(121), (149), (152)]

10. DMEC riders provide invaluable experience and technical expertise to the Engineering Department while embarked. It would adversely affect the crew and operational readiness of the hulls to allow DMEC's contract to end. These technical experts are instrumental in bridging the corrective maintenance gap that exists between ship's force capabilities and what is accomplished during CMAV/RAVs and emergent maintenance repair opportunities. [FF (Background Information), (18), (47), (147)-(148)]

11. The permanent stationing of the Port Engineer (PE) in San Diego, dual assigned to FRE (a ship with a demanding maintenance challenges), adversely impacts the amount and quality of support the PE can provide. On-site support is critical to assist S/F identify and correct ship-wide discrepancies. [FF (Background Information), (145)]

12. Previous crew swap initiatives have revealed a lack of ownership sometimes results in substandard stewardship. On FTW, the crew stated they all feel a sense of ownership but many readily admitted they are concerned any work they put into the ship to improve it would not be adequately maintained by follow-on crews. FTW has had four different crews since deployment and is expected to have her fifth different team out in May. The fact crews are not returning to the hull make ownership more of a challenge but as the LCS program matures and more ships are available to consistently execute the 3-2-1 model, ownership will naturally improve. [FF (Background Information), (134), (136), (153)]

13. Acute lack of not a ing factor in this casualty, as both (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) stated they were adequately rested their 12 Jan 16. There is nothing to indicate that either Sailor's physical or mental state was compromised in a way that would have prevented them from sound decision-making. However, I believe that cumulative exhaustion may have been a contributing factor. This exhaustion was compounded by the frustration the crew's engineers felt in not being able to catch up on existing work while simultaneously being ented with a long list of discrepancies identified by LCSRON ONE (b)(6) and (b)(the week preceding the casualty. [FF (20), (21)-(22), (24)-(25), -(35), (40), (81)-(83), (102), (134)-(135), (150)-(152)]

14. The ship's most recent DEOCS revealed many troubling aspects of command climate at the time the survey was taken (July 2015), most notably in the areas of Job Satisfaction, Exhaustion, Command Communications and Trust in Leadership. These results, however, must be viewed in the context of the crew's operational employment at the time. Crew 101 was likely feeling significant pressure as it struggled to complete its EOC before FRE could start its dry-dock availability. It is understandable that the long workdays and multiple competing requirements from a demanding schedule likely took their toll on crew motivation, morale and the feeling senior

leadership was looking out for their best interests. In light of these factors, I do not believe the DEOCS results were indicative of a climate significantly worse than that which would normally be found in crews in the midst of similar circumstances. In fact, the LCSRON ONE Commodore agreed they were consistent with results they've seen from other LCS crews going through the same process. [FF (Background Information), (110)-(111), (113), (115), (149)]

15. An informal, wholly unscientific, random sampling of the crew carried out by members of the investigation team revealed continued concerns with exhaustion and communications but is mixed with respect to trust and confidence in leadership. Again, these results were not unexpected when one analyzes the high OPTEMPO the crew has been exposed to since deployment and the fact it was taken on the heels of the CG casualty. The fact that the CO's suggestion box is always full is, however, a warning sign there is a lack of open communication as Sailors feel this is their primary avenue to communicate with the Chain of Command. If a ship is running effectively with a good flow of communications, up and down, suggestion box comments will normally be rare. An updated formal DEOMI survey will be required to provide a clearer and more detailed picture of command health. [FF (Background Information), (20)-(21), (22), (24)-(25), (27), (31), (33), (82), (168)]

16. Manning shortfalls did not contribute to the casualty. Although several of Crew 101's Engineering Department personnel were relatively new to the organization, billets were adequately filled IAW the LCS manning plan. However, I believe additional engineering billets would help to distribute the workload and ease stress on LCS crews. [FF (Background Information), (1), (3), (5)-(7), (9), (11), (18)-(19), (31), (81)-(82), (116), (140), (150)]

17. The FLE is not being used in the manner for which it was intended. FLE personnel should take every opportunity to be on board the ship when it is in port Singapore. As delineated in the LCSRON ONE/DESRON 7 MOU, FLE should essentially be an extension of the crew, helping them conduct material assessments to identify and ensure corrective actions on material discrepancies are taken. This can only be accomplished with aggressive, hands-on, in-space presence. [FF (30)-(32), (81)-(82), (90), (140)-(146)]

18. Not filling the FLE OIC billet and putting those responsibilities under DESRON 7 N4 has had an adverse effect on maintenance accomplishment and FLE effectiveness. The FLE OIC's (1110 LT) singular focus on ship maintenance was critical in coordinating all maintenance activities and optimizing the utilization of FLE personnel. [FF (140)-(146)]

19. The current exchange of command/hull turnover process is not being fully executed in accordance with LCSRON ONE's instruction.

Additionally, more direct oversight and involvement by both the operational and administrative chains of command is required during turnovers to ensure crew focus, consistency of product and a more accurate assessment of the ship's material condition is achieved. [FF (Background Information), (118), (123)-(134)]

20. Historically, during hull turnover periods, DESRON 7's N4 is too heavily involved in making crew logistics arrangements (e.g., customs, ground transportation, lodging) vice leading the DESRON 7 FLE personnel in assessing the ship's material condition. Because the turnover period is short and the list of items the crew must accomplish is long, a detailed DESRON N4/FLE assessment would help to provide the on-coming crew and maintenance community with a more accurate assessment of the ship's material condition than the crew's engineers can accomplish themselves. [FF (Background Information), (123)-(136), (140)-(146), (151)]

21. The CO, in my view, is hard working and intelligent, but has yet to gain the necessary experience to be completely comfortable or confident in command. CDR Atwell's specific career path has given him very few opportunities to gain valuable at-sea experience. By his own account, the last time he spent any considerable time on the Bridge of a ship, prior to reporting to the LCS program, was when he was a second tour Division Officer. His first Department Head tour was as CHENG on a Pre-Commissioned DDG in which he stood TAO after the ship got underway from the shipyard. His second Department Head tour was as a squadron Material Officer (N4). Although these Department Head tours gave him a solid engineering background, they provided little opportunity for him to gain at-sea operational experience. Following his Department Head tours he spent four years at STRATCOM prior to starting the PCO/PXO pipeline.

During Crew 101's On-Hull time on FRE in 2014, while CDR Atwell was XO, FRE entered a maintenance availability which limited their total underway time to approximately three weeks. After assuming command, and during Crew 101's On-Hull period prior to deployment, FRE again entered a maintenance availability which again limited their operational underway time to approximately 3 weeks. Although he said he received great refresher training at SWOS in the PCO/PXO and 6-week LCS OOD courses, he would have benefited greatly with more actual operational underway time prior to deployment.

LCSRON ONE CDRE noted CDR Atwell's lack of experience and spent a lot of time mentoring him. Just weeks before Crew 101 deployed the Commodore stated he had seen a marked improvement in his performance during SUSTEX and felt he was ready to deploy. DESRON 7 CDRE expressed concerns with CDR Atwell n forward and with his command presence and provided (b)(6) and (b)(7)(C) while onboard FTW during CARAT, but felt he would ge e. I believe CDR Atwell has the capacity and will continue to evolve and become more

effective as a leader as he gains the confidence that comes from experience. [FF (Background Information), (1), (2), (20)-(22), (24), (25), (27), (34), (163), (167)]

22. The Executive Officer is a hard-charging, experienced, and highly capable Surface Warfare Officer. In my opinion, he has a strong grasp of the challenges Crew 101 faces and is working energetically on process improvement, drafting numerous Lessons Learned reports which he's shared with other LCS crew XOs. The informal survey we conducted indicated he has the full trust and confidence of the crew and, although he does not have an engineering background, his experience as CO/XO of a MCM crew enables him to provide forceful backup to the CO if necessary. [FF (Background Information), (3), (4), (17), (18), (20)-(27), (146)]

23. The (b)(6) and (b)(7)(C) is a hard-working, experienced and knowledgeable engineer. a LDO with extensive prior enlisted service and tours as MPA on two different platforms, he has the background and technical expertise to do the job but is struggling to manage the unique challenges of a minimally manned department. Unquestionably he is hard-working and determined; however, his previous experiences were rooted in self-sufficiency and he has a difficult time seeking or admitting he needs help, which is the cornerstone of the LCS maintenance plan. His frustration with the support he has received and his unfamiliarity with the responsibilities of the support resources available to LCS crews has compounded his reluctance to reach out for help.

Within the Engineering Department, the (b)(6) and (b)(7)(C) is further lenged by the lack of experience of hi ry assistant, the (b)(6) and (b)(7) Prior to reporting to Crew 101, the (b)(6) and (b)(7)(C) only operational rience was as an Anti-Submarine Warfar icer on a DDG and, in my opinion, incapable of pr ng the deck-plate support and up the (b)(6) and (b)(7)(C) requires. The (b)(6) and (b)(7)(C) lack of experience forces the (b)(6) and (b)(7)(C) to div is time/efforts en t nutia and overall tme management. The fact that the (b)(6) and (b)(7)(C) stands watch as a TAO and the (b)(6) and stands watch on the Bridge whi y exacerbates the problem. n a positive note, although the (b)(6) and (b)(7)(C) is unfamiliar with the LCS propulsion plant, having less nths of time in the LCS community, he has a strong background on MCM/MHCs and is a solid addition to the department.

(b)(6) and (b)(7)(C) has the foundation to become an effective leader. To do so, er, he must be able to step back from his tendency to "turn wrenches" and instead focus on being more of a department manager - delegating, empowering and challenging his Sailors while holding them fully accountable for their actions. [FF (Background Information), (7)-(18), (30), (31), (81), (82), (86), (87), (90), (115), (127), (150), (156), (160), (161), (165), (166)]

24. The Command Master Chief is intelligent and genuinely motivated, but has no prior ship's company experience, having served his entire career in the aviation community. As such, he has had a steep learning curve since joining Crew 101 and is still "learning the ropes" with respect to shipboard operations. In our informal survey, his shipmates have noted his impressive work ethic, genuine concern for the crew, and honesty but say he needs a little work becoming a more efficient communicator, bridging gaps between the crew's enlisted personnel and the wardroom. I am confident CMDCM Winn is making the necessary adjustments, adapting to the challenges of surface ship life and will be instrumental in getting Crew 101 back on track. [FF (5), (6), (168)]

Subj: COMMAND INVESTIGATION INTO THE COMBINING GEAR CASUALTIES ON BOARD USS FORT WORTH (LCS 3) ON 12 JAN 16

Recommendations

1. Crew 101 require (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C) to requalify in RCO, EDO and EPT positions ficat emphasize watchstander level of knowledge, familiarity with EOCC immediate and controlling actions and emphasize strict adherence to EOSS.

2. Crew 101 obtain and distribute to all hands hard copies of the CNSP Watchstanders' Guide. Additionally, require all personnel to maintain it on their person while on hull.

3. Crew 101 conduct a formal stand down to reinforce watchstanding principles with particular emphasis on Procedural Compliance and good engineering practices.

4. Crew 101 update the Commanding Officer's Standing Orders to include a section on Procedural Compliance.

5. Crew 101 conduct a DEOCS climate survey as soon as practicable.

6. Crew 101 conduct an Afloat Culture Workshop as soon as practicable.

7. LCSRON ONE, as operationally feasible, endeavor to split future CNO availabilities between at least two LCS crews to provide each of the crews adequate operational time prior to deployment.

8. LCSRON ONE ensure training hulls are materially ready to support LCS crew EOCs.

9. LCSRON ONE continue the practice of having several of their staff members, Reservist Sailors, and off-hull crews assist with readying each hull for Material Inspections and crew's engineering milestones. This not only cultivates a Squadron-wide culture of teamwork and ownership but it improves LCS Sailors' shipboard familiarity.

10. LCSRON ONE ensure any remedial training requirements for full crew certification are aggressively tracked and completed prior to crews departing for deployment.

11. LCSRON ONE and DESRON 7 provide continued oversight of Crew 101 until satisfied that a shipboard culture embracing the core watchstanding principles of Integrity, Formality, Procedural Compliance, Level of Knowledge, Questioning Attitude, Forceful Backup, and Organizational Risk Mitigation has been well and truly established.

(b)(5)

(b)(5)

13. LCSRON ONE work with vendor and pipeline training organizations to amend LCS training products and briefs to emphasize that MPDE operation will induce CG component rotation, thereby requiring CG lube oil alignment.

14. LCSRON ONE submit a EOSS Feedback Report to update CMPDE to include a warning to the effect that running the MPDE's without CG L/O system in operation will result in damage to the CG.

15. LCSRON ONE submit a EOSS Feedback Report to correct the terminology differences between MPCMS displays and EOCC procedures that describe a hot reduction gear bearing condition - either "hi hi" or "very high."

16. LCSRON ONE fund durable smart tablets for crews to load technical manuals on, to use to improve equipment knowledge, facilitate in-space troubleshooting and casualty diagnosis.

17. LCSRON ONE spearhead periodic working groups to review active TSOs and LOPs on each hull to determine if the they are technically sound and applicable.

18. LCSRON ONE develop a process to ensure off-hull crews are promptly informed of changes to EOSS/LOP/TSOs and other applicable directives prior to going on-hull. Additionally, ensure all crews conduct a formal review of all applicable EOSS, LOPs, DFSs, TSOs and Class Advisories, paying particular attention to any changes that have occurred since they last embarked that specific hull.

19. LCSRON ONE work with the systems designers to expedite delivery of the shore-based virtual-reality training facility to improve LCS deck-plate engineers' level of knowledge and operational competence.

20. LCSRON ONE extend hull turnovers to 6-8 days to ensure an adequate assessment by the on-coming crew and, when operationally feasible, enforce the underway demonstration requirement to ensure on-coming crews get to test and operate shipboard systems and equipment prior to turnover.

21. LCSRON ONE and DESRON 7 increase support during the crew Exchange of Command process to facilitate a better understanding of trends, ensure consistency of turnover, and to allow crews to focus on turnover tasks. Specifically;

- DESRON 7 N4 provide an in-brief to all CHENGs inbound to forward-deployed hulls to inform them of all maintenance support available in theater.

- DESRON 7 assign another officer to relieve the N4 of his duties managing the crew logistic aspects of crew turnovers. This would allow him/her to be more involved in facilitating an accurate assessment of the ship's material condition and help ensure an effective engineering turnover.

- Prior to each hull turnover, LCSRON ONE or DESRON 7 N4 conduct a formal material assessment of the ship while underway and assist the off-going crews in making necessary corrections or documenting all discrepancies in the CSMP.

22. LCSRON ONE work with CNSP N1 to add a Diesel Engine Inspector (DEI) to the staff to help train crews and assess material condition of the MMPDs and SSDGs.

23. LCSRON ONE work with CNSP N1 to designate all LCS MPA billets as second tour LDO (6130) and Chief Engineer billets as second tour 1110 Department Head.

24. LCSRON ONE standardize divisional space assignments from hull to hull.

25. LCSRON ONE work with the CNSP N4 to assign a PE in Singapore to facilitate coordination of repair efforts on forward deployed hulls.

26. LCSRON ONE work to extend DMEC's contract indefinitely and provide two riders per hull irrespective of ship's schedule or geographic location.

27. LCSRON ONE continue to update the LCS 1 FREEDOM Variant POG and provide copies to each hull.

28. LCSRON ONE look into the feasibility of increasing engineering manpower with two additional engineers per crew (notionally one EN2 and, if feasible, one GSE2).

29. LCSRON ONE work with PEO to finalize the LCSRON Class Maintenance Manual to specifically codify processes and organizational responsibilities.

30. LCSRON ONE spearhead an effort to assess and streamline the process by which jobs for corrective actions on ship's equipment are written, submitted, approved, and executed.

(b)(5)

32. NAVSEA amend the CG/SG HMI software so that the display icon on the HMI that accompanies a "CG L/O Pump Off" condition is red instead of green.

33. NAVSEA modify the MPDE LECP software to add a CG/SG "Gear is Ready" permissive.

34. PEO replace the current Isotta-Fraschini SSDG models on LCS 1 and 3 with either the upgraded models installed on LCS 5 and above, or with SSDGs that are more reliable and less maintenance intensive (e.g., MTU or Caterpillar). In the interim, increase the level of focus on the existing models to include more frequent grooms before and during deployment.

35. DESRON 7 work with the applicable community personnel managers/placement teams to expedite filling the Senior Chief Petty Officer FLE position.

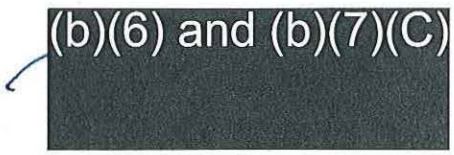
36. DESRON 7 conduct training with N4 FLE personnel to ensure they understand and meet the requirements of the LCSRON ONE/DESRON 7 MOU.

37. DESRON 7 work with LCSRON ONE and CNSP N1 to re-establish the FLE OIC LT billet.

38. DESRON 7 work with CLWP to schedule opportunities to increase the length of the mid-deployment RAV to accomplish larger scope maintenance actions.

39. The following personnel actions are recommended:

- Appropriate disciplinary or administrative action for (b)(6) and (b)(7)(C) and (b)(6) and (b)(7)(C).
- Appropriate administrative action for the Commanding Officer and (b)(6) and (b)(7)(C).



Glossary of Acronyms (Appendix 1)

3M	Maintenance and Material Management
3MC	Maintenance and Material Management Coordinator
AMZ	Airborne Mission Zone
ASM	Advanced Skills Management (tracks qualifications)
ARTEC	Company that provides reduction gear training to LCS crews
ASWO	Anti-Submarine Warfare Officer
ATGPAC	Afloat Training Group Pacific
ATIS	Automated Technical Information System
AVCERT	Aviation Certification
C7F	Commander, SEVENTH Fleet
CCS	Central Control Station
CDO	Command Duty Officer
CDRE	Commodore
CFOP	Console Fuel Oil Pump
CG	Combining Gear
CHENG	Chief Engineer
CI	Command Investigation
CICO	Combat Information Center Officer
CLWP	Commander, Logistics Group Western Pacific
CMAV	Corrective Maintenance Availability
CMDCM	Command Master Chief
CMPDE	Console Main Propulsion Diesel Engine
CNO	Chief of Naval Operations
CNSP	Commander, Naval Surface Force Pacific

CO	Commanding Officer
COC	Chain of Command
COMMO	Communications Officer
CONOPS	Concept of Operations
CONUS	Continental United States
CSG	Carrier Strike Group
CSPP	Course Scheduling and Phasing Plans
DEI	Diesel Engine Inspector
DEOCS	Defense Equal Opportunity Organizational Climate Survey
DEOMI	Defense Equal Opportunity Management Institute
DESRON	Destroyer Squadron
DET	Detachment
DMEC	Duke Marine Engineering Consultants
EAP	Engineering Assessments - Pacific
EDO	Engineering Duty Officer
EDORM	Engineering Department Organization and Readiness Manual
ELECO	Electrical Officer
ELOP	Electric Lube Oil Pump
EOC	Engineering Operational Certification
EOCC	Engineering Operational Casualty Control
EOOW	Engineering Officer of the Watch
EOSS	Engineering Operational Sequencing System
EPOP	Engineering Plant Operating Parameters
EPT	Engineering Plant Technician

ETT	Engineering Training Team
FLE	Forward Liaison Element
FOP	Fuel Oil Purifier
FOSP	Fuel Oil Service Pump
FRE	USS FREEDOM (LCS 1)
FTW	USS FTW (LCS 3)
HMI	Human-Machine Interface
IAW	In Accordance With
IDCERTEX	Independent Deployer Certification Exercise
IEM	Inport Equipment Monitor
ISATT	Integrated Ship-Aviation Team Trainer
ISEA	In-Service Engineering Activity
ISIC	Immediate Superior in Command
L/O	Lube Oil
LCS	Littoral Combat Ship
LCSRON	Littoral Combat Ship Squadron
LDO	Limited Duty Officer
LECP	Local Engine Control Panel
LOCOP	Local Operating Panel
LOP	Local Operating Procedure
LOTA	Lube Oil Transfer Alignment
LOTP	Lube Oil Transfer Pump
LTF	Littoral Combat Ship Training Facility
MCM	Mine Counter Measures
MEDA	Main Engine Diesel Alignment

MHBRG	Master Hot Bearing Reduction Gear
MHC	Mine Hunter Coastal
MLOC	Master Light Off Checklist
MMFOL	Master Major Fuel Oil Leak
MMR	Main Machinery Room
MOU	Memorandum of Understanding
MP	Mission Package
MPA	Main Propulsion Assistant
MPAC	Medium Pressure Air Compressor
MPCMS	Machinery Plant Control and Monitoring System
MPDE	Main Propulsion Diesel Engine
NAV	Navigator
NAVSEA	Naval Sea Systems Command
NIAPS	Navy Information Application Product Suite
NSWCPD	Naval Surface Warfare Center Philadelphia Division
OIC	Officer-in-Charge
OCONUS	Outside of the Continental United States
OOD	Officer of the Deck
OPTEMPO	Operational Tempo
OPTEST	Operational Test
PE	Port Engineer
PEO	Program Executive Officer
PI	Preliminary Inquiry
PIO	Preliminary Inquiry Officer
PMAV	Preventive Maintenance Availability

PMS	Preventive Maintenance System
POG	Propulsion Operating Guide
PQS	Personnel Qualification Standards
PSVT	Port Visit
RAV	Restricted Availability
RCO	Readiness Control Officer (Engineering Officer of the Watch (EOOW) equivalent on most Navy surface ships)
RHIB	Rigid-Hull Inflatable Boat
RTD	Resistance Temperature Detector
S/F	Ship's Force
SAT	Satisfactory
SG	Splitter Gear
SSDG	Ship's Service Diesel Generator
STBD	Starboard
STO	Safe to Operate
STRATCOM	Strategic Command
STT	Safe to Train
SUSTEX	Sustainment Exercise
SUW MP	Surface Warfare Mission Package
SWO	Surface Warfare Officer
SWOS	Surface Warfare Officer School
T2C	Train to Certify
T2Q	Train to Qualify
TAO	Tactical Action Officer
TSO	Temporary Standing Order
TYCOM	Type Commander

VCHT Vacuum Collection Holding and Transfer

WOWU Week One Work-Ups

XO Executive Officer

ZIDL Zone Inspection Deficiency List