Coast Guard Safety Report

A Five Year Retrospective Review

OCTOBER 2011

RADM Mark Tedesco, MD, MPH
Commandant (CG-11)
Director, Health, Safety and Work-Life

TABLE OF CONTENTS

From the desk of the Coast Guard Safety Chief

Fellow Shipmates –

The Coast Guard is a dynamic and adaptive organization. After 9/11, our organization embarked on a significant course change that reinforced the national view that the Coast Guard is one of the most trusted agents in the fight against terrorism and as preeminent responders during times of need. With that change came a notable increase in both our on and off-duty mishaps, indicating that perhaps the changes were impacting our ability to detect hazards in our every day missions.

Since I assumed the helm in 2007, we have worked tirelessly to reduce our mishap rates and I am pleased to report that we have made significant strides and that our mishap trends are headed in the right direction. Our greatest success story is in our off-duty mishap area, particularly motor vehicles and motorcycles. We have seen significant reductions in the cost of these mishaps to the organization, beyond the mishap rates, to include reduced hospital and lost duty time costs. Where we have seen upticks in our operational mishap rates, we have acted swiftly and purposefully – to great effect.

In 2008, the Coast Guard began the journey to a greater culture of safety, whereby "safe" is simply *how* we do business. We are moving out on a number of fronts to a more proactive posture based on a close collaboration between our Coast Guard operators and the safety program. We are revamping our approach to operational risk management to meet the organizations diverse mission needs while developing tools, in close concert with the operators, to improve hazard identification ahead of and during mission execution.

I look forward to ever-increasing engagement between all elements of the Coast Guard as we work more closely than ever to get out ahead of our mishaps by recognizing and reducing hazards. Semper Paratus.

Mark J. Tedesco, MD, MPH
Rear Admiral
U.S. Coast Guard

AVIATION SAFETY

Aviation Mishap Rates FY01 – FY10

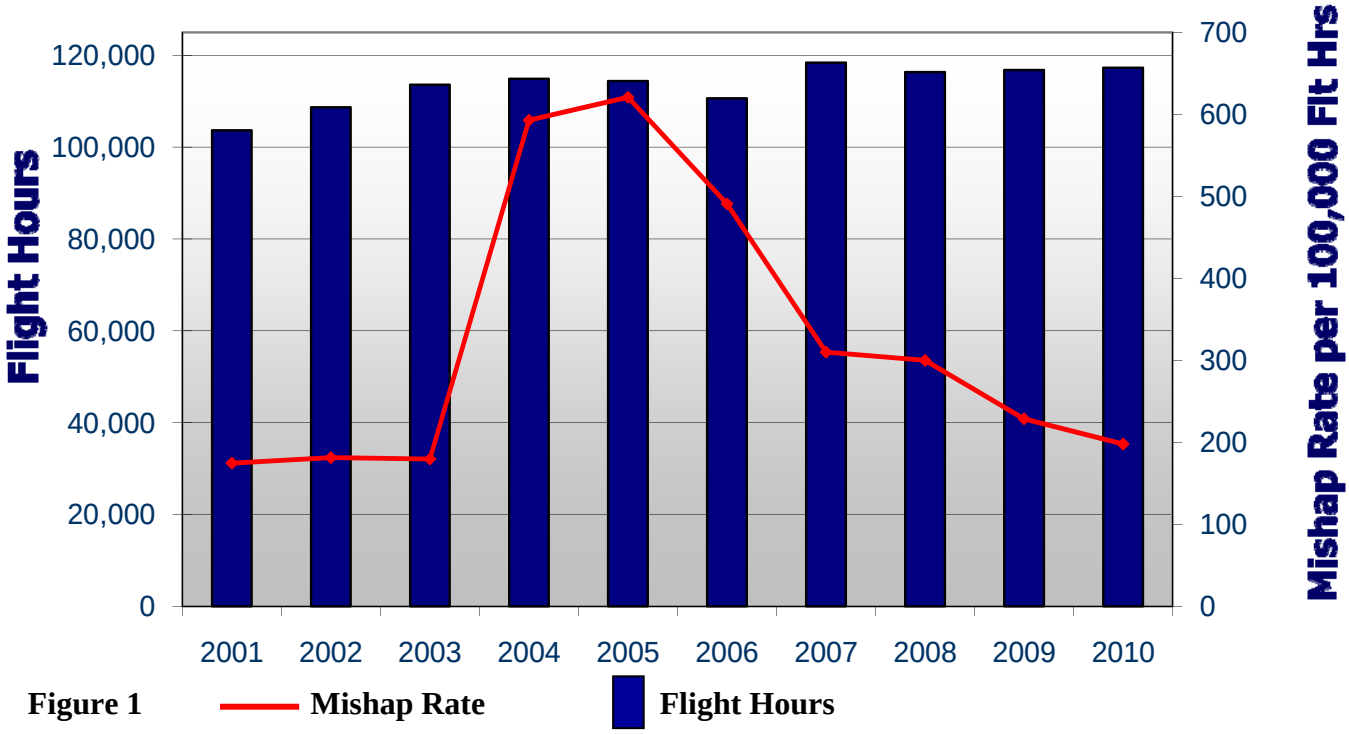

Figure 1 **Mishap Rate** **Flight Hours**

Figure 1 compares the A,B,C,D flight mishap rate per 100,000 flight hours to annual flight hours. In the past several years flight hours per year have increased while the total number of mishaps has decreased leading to a steady mishap rate decrease. The 2003-2004 rate jump is attributed to increased reporting of Class "E" engine mishaps and MRM mishaps resulting from awareness campaigns. This graph projects an overall good picture for CG Aviation, but does not adequately depict current concerns with the Class "A" mishap rate (Figure 2).

Class A Aviation Mishaps FY56 – FY10

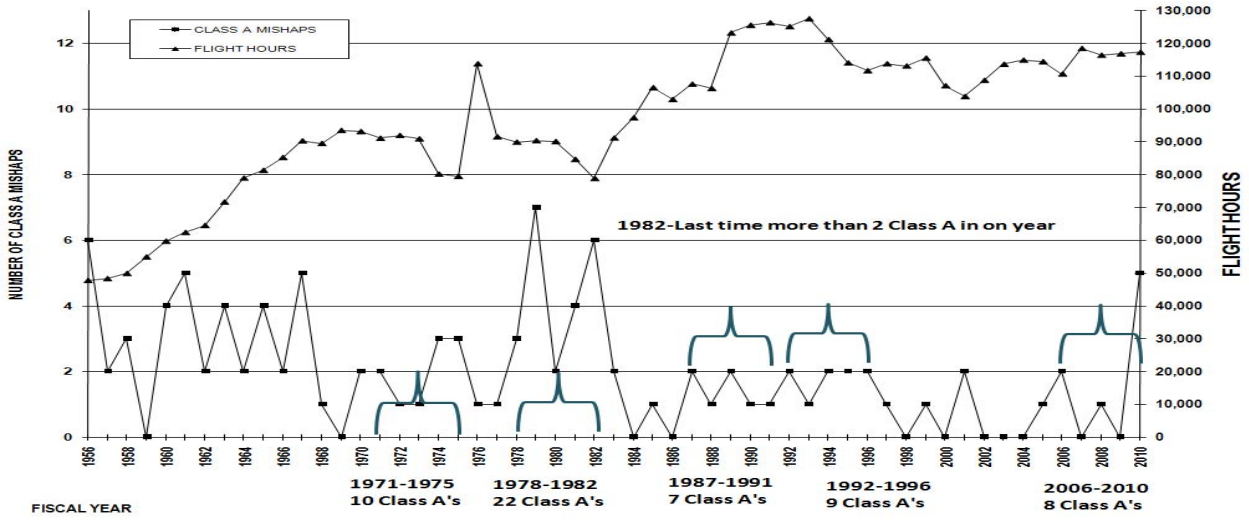

Figure 2

Continued Class A Aviation Mishaps FY56 - FY10

For the 27 years from FY-83 through FY-2009 Coast Guard Aviation averaged 1 Class A flight Mishap per fiscal year. The number of mishaps per year varied from zero to two. The mishaps were evenly distributed with nine years each of zero, one or two mishaps. This pattern ended in FY-10 when we experienced five Class "A" Flight Mishaps.

The 6505 mishap in 2008 was the first fatal mishap since 1997; there were 6 non fatal Class A's during that time frame. 1982 was the last time there were more than 2 Class A mishaps in one year. Of the 32 Class A mishaps since then, 7 were fatal resulting in 34 deaths.

Flight Mishap Costs FY01 – FY10

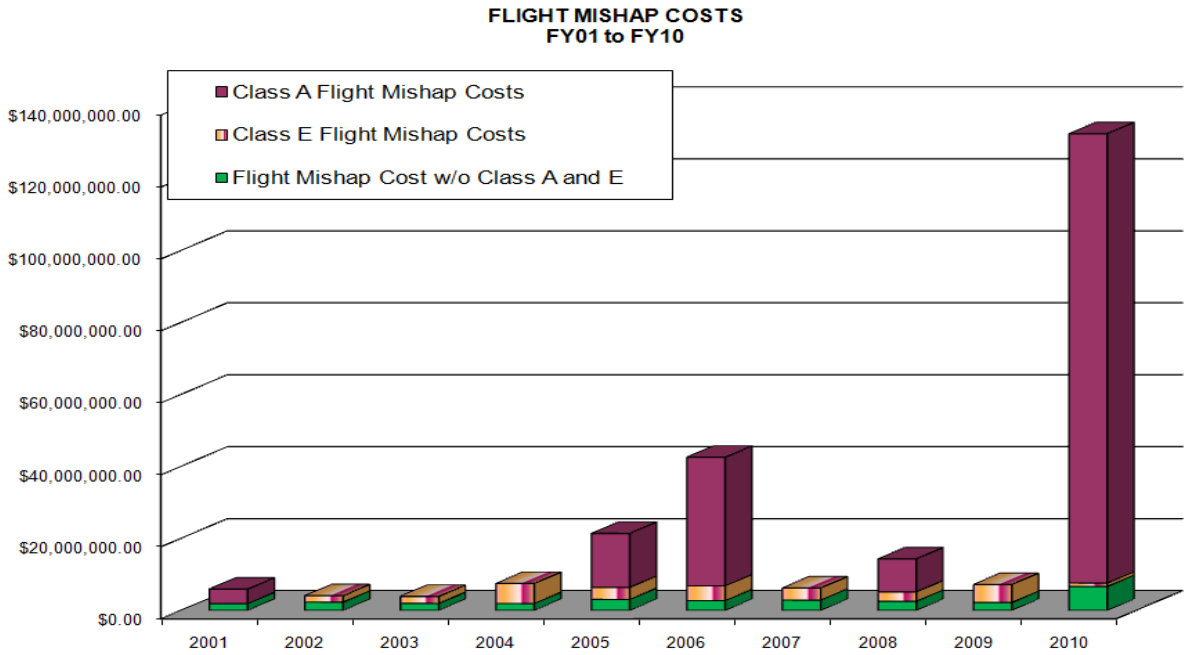

Figure 3

Figure 3 depicts the cost of the FY-10 Class A mishap spike. Over the last ten years the Coast Guard's flight mishap costs have been fairly stable with spikes created by Class A mishaps. The chart clearly shows how dramatically class A mishaps affect cost and the unprecedented cost of five class A flight mishaps in FY-10. In addition there were 3 Class B mishaps in FY-10; each of which had costs over one million dollars.

SHORE AND SECTOR OPERATIONAL SAFETY DIVISION

DON'T LET YOUR "GUARD" DOWN

Summary of Sector and Shore Operations Mishaps (Including Sector sub-units)

Fortunately, there were no shore-based operationally related (on-duty) deaths or permanent disability mishaps. However, there were numerous Class C's and D's. FY 2010 saw a slight decrease in total mishaps from FY 2009 including fewer Class C and Class D mishaps than had been experienced, on average, over the previous 5 years. Class C and D mishaps are generally thought to be leading indicators for more significant mishaps and should be examined to determine the root (underlying) causes so that they may be corrected.

Population data vs. Mishaps

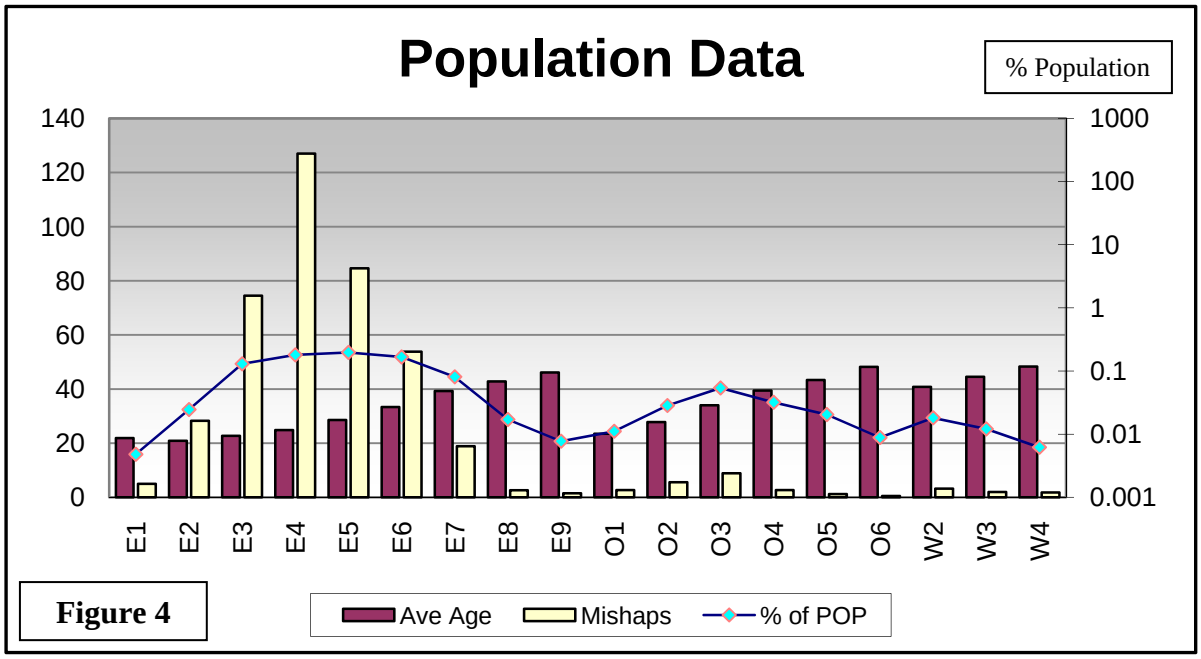

Figure 4

Figure 4 displays population data (enlisted and officer personnel) compared to recorded mishaps. Age, rank and mishaps correlate; therefore a conclusion about our junior population and risk factors can be drawn. Commands should pay special attention to and stress the need for safety reinforcement within younger populations.

Total Shore Mishaps and Lost Days vs. Off-duty Mishaps and Lost Days

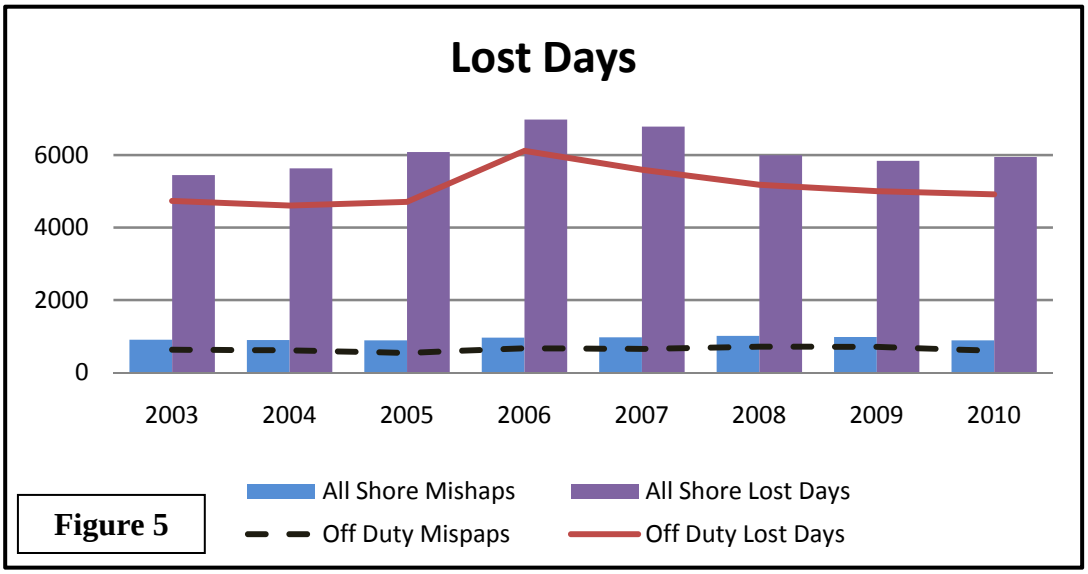

Figure 5

Figure 5 notes the large percentage of Shore Lost Days that are attributable to off-duty mishaps. The Coast Guard as a whole has been experiencing more off-duty vice on-duty mishaps. In the future this can be an excellent opportunity to partner with MWR to evaluate and establish policy, procedures, and training and recreational safety awareness.

Total vs. On/Off-Duty and PMV Mishaps

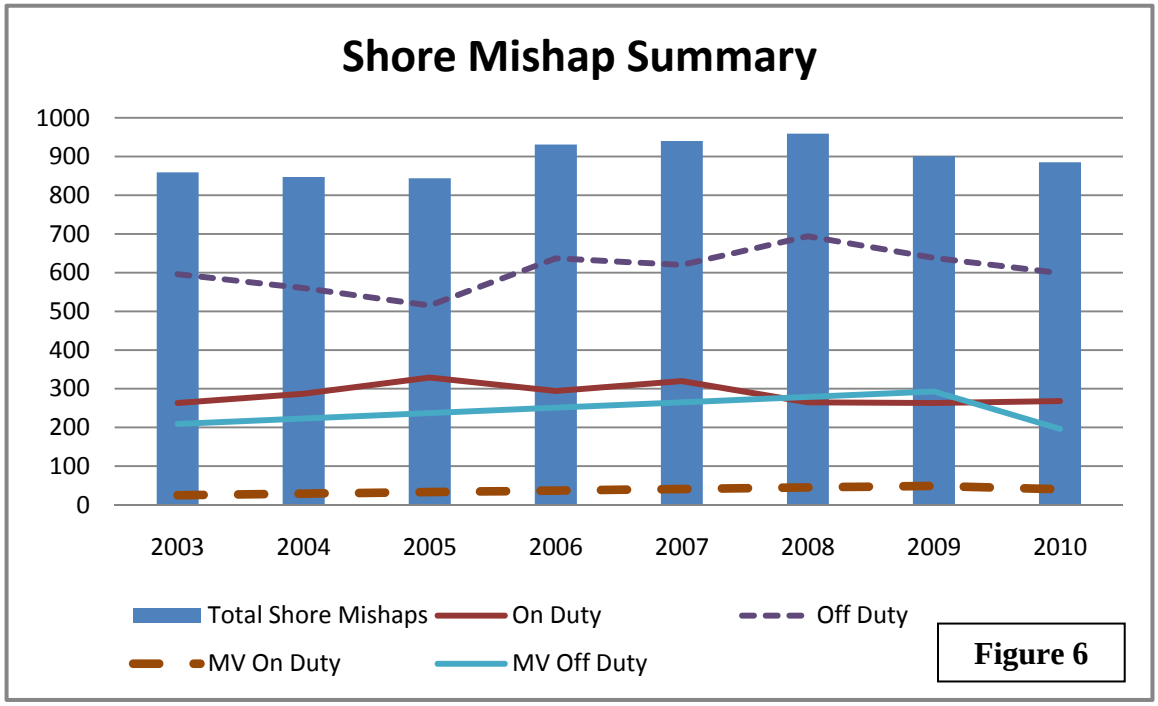

Figure 6

Figure 6 summarizes Total Shore Mishaps versus On-duty/Off-duty and Private Motor Vehicle (PMV) statistics from 2003-2010. Off-duty Mishaps account for more than any other category and are just about double that of On-duty Mishaps.

Total Shore Mishaps On-Duty vs. Off-Duty

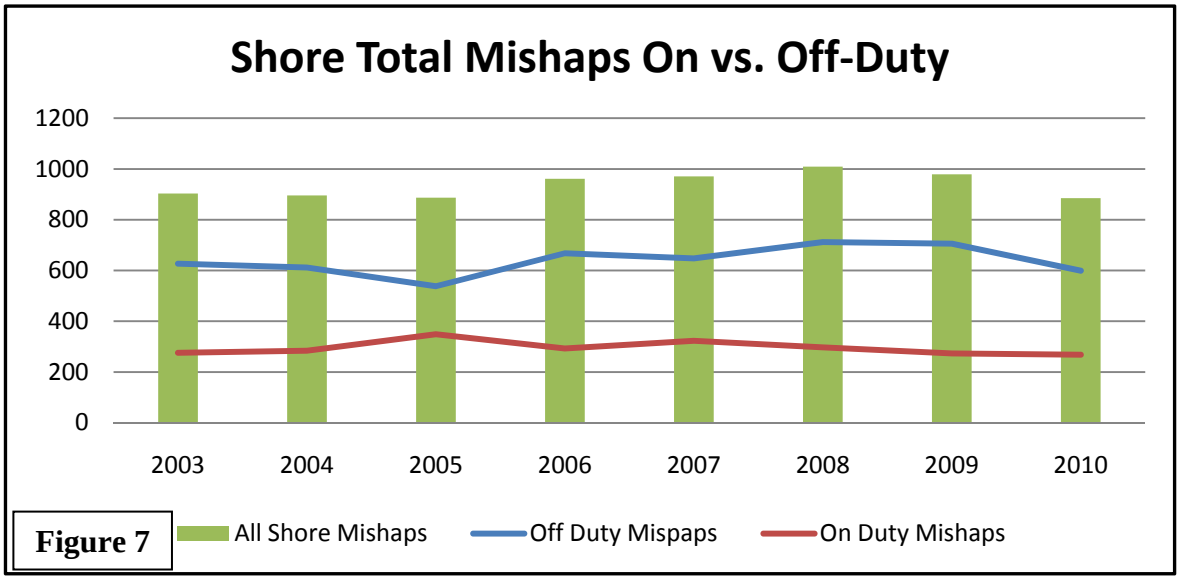

Figure 7

Figure 7 shows that the majority of all Shore Mishaps occur Off-Duty versus On-Duty indicating, once again, that more emphasis needs to be placed on the Coast Guard's Off-Duty/Recreational Safety Program.

Likewise, this data indicates that the off-duty/recreational mishaps are not only more probable than the operational mishaps but that personnel may be taking more risks on their off-duty time than they would take while on-duty.

Motor Vehicle Class A Mishaps Rates FY05 – FY11

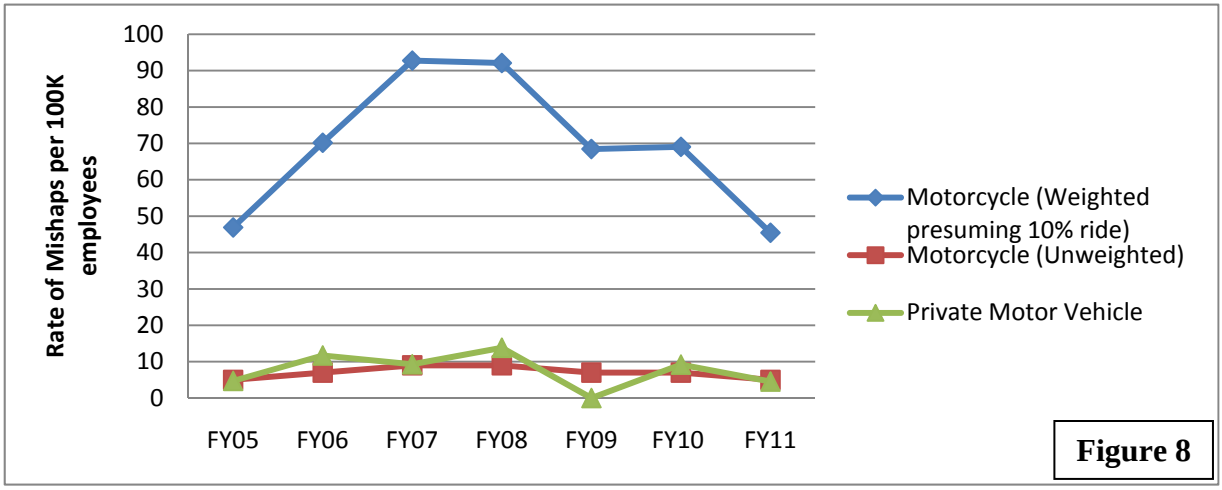

Figure 8

Figure 8 shows in 2007, under the direction of RADM Tedesco (CG-11), the Office of Safety and Environmental Health began conducting in-depth mishap investigations on all off-duty Class A and B motor vehicle and motorcycle mishaps in addition to the on-duty mishaps to determine what the underlining causal factors were for the sudden spike in fatal mishaps. The motorcycle mishap investigations and analyses pointed to the primary causal factors of rate of speed and losing control, especially during turns.

Motorcycle Mishap Data FY 2005 – FY 2010

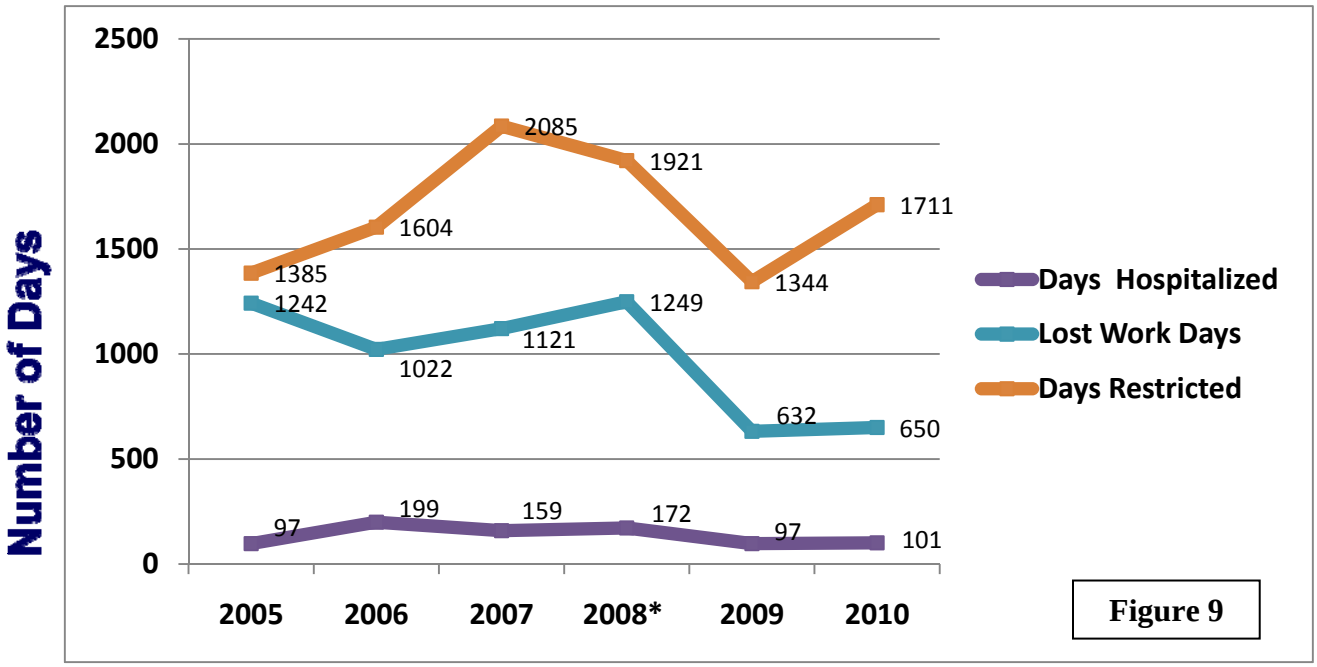

Figure 9

*Note: July 2008 Motorcycle Training Funded

	2005	2006	2007	2008	2009	2010	2011
Motor Cycle (MC) Fatalities	**2**	**3**	**4**	**4**	**3**	**3**	**2**
Total MC Mishaps	**95**	**104**	**101**	**129**	**118**	**93**	**89**
Personal Motor Vehicle (PMV) Fatalities	**2**	**5**	**4**	**6**	**0**	**4**	**2**
Total PMV Mishaps	**202**	**263**	**255**	**248**	**288**	**267**	**213**

CG-11 looks at lost workdays due to motorcycle mishaps, hospitalizations, restricted duty days and the overall number of mishaps from any class that had been reported in addition to the number of Class A mishaps. The purpose is to get a clearer idea of how we are doing overall in motorcycle safety. As the chart shows, the Coast Guard has three or four motorcycle fatalities a year – the number of fatalities is small. The chart helps us understand trends based on other indicators besides just fatalities. At the time of publication, the Coast Guard experienced only 2 Motorcycle fatalities in 2011.

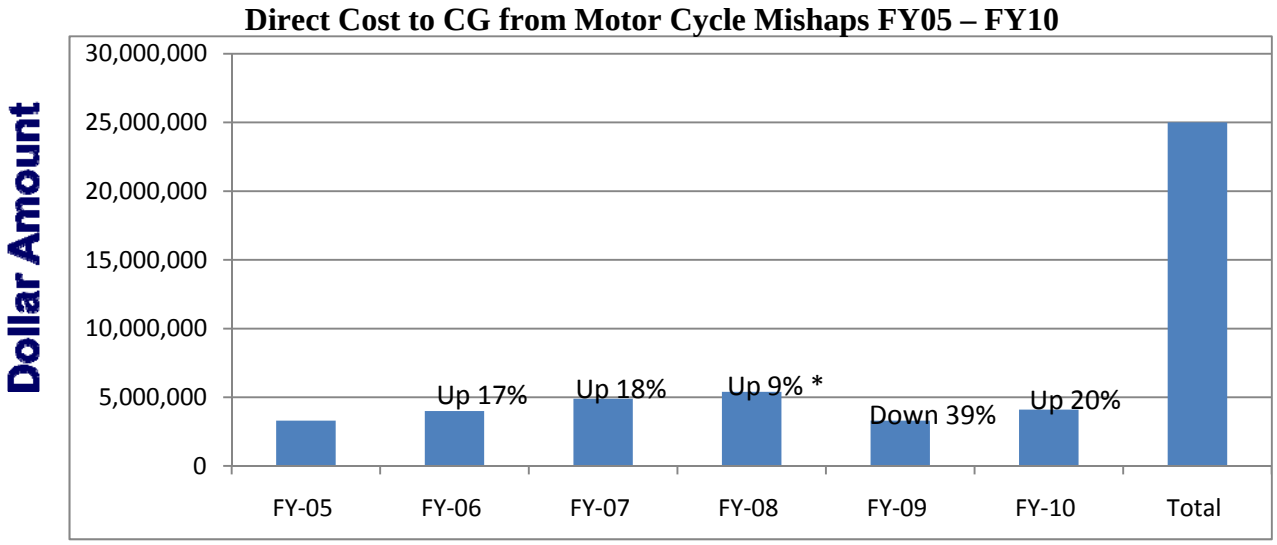

Figure 10

Overall, the Coast Guard is seeing positive trends. CG-1132 uses DoD cost figures to calculate costs of fatalities, permanent disability, etc. Compared to two years ago, the total costs due to motorcycle mishaps are down.

Traffic Safety FY2010

The Coast Guard has implemented a number of initiatives.

1. The "Don't Let Your GUARD Down" is nationwide safety campaign that originated in the Atlantic Area a few years ago. The campaign's name is a play on words and is meant to work as a personal reminder as well as an altruistic one. This campaign has developed targeted programs for all personnel, so that leadership and junior personnel alike can ensure safety becomes an ingrained part of their life, on and off work, twenty-four/seven.
2. Motorcycle Safety Training reimbursement program for basic and advanced rider courses.
3. Motorcycle training at Coast Guard installations. There are now eight motorcycle training sites. The training sites are open to DoD personnel just as DoD sites are open to train Coast Guard personnel.
4. Texting While Driving General Order that created new policy for personnel who operate government vehicles and/or use government issued devices (e.g., phones and personal digital assistants).
5. Personal Protective Equipment General Order. In early 2007, when RADM Tedesco came on board, the Coast Guard had three fatalities in a row that were avoidable if the individual had used his/her motorcycle helmet or seat belt. Admiral Allen, the Coast Guard Commandant at the time, issued a General Order requiring members to wear a seatbelt and a motorcycle helmet at all times regardless of lesser civilian restrictions. The General Order provided leadership with a tool for enforcing Coast Guard policy. On August 10, 2011, this General Order was reissued by Admiral Papp. Since the General Order was first published and emphasized, the CG has experienced only 1 fatality due to failure to wear PPE.

ENVIRONMENTAL HEALTH

Occupational Medicine Program

OMSEP Evaluation/ EHR Implementation
CG-1133 has spearheaded a rework of the Occupational Medical Surveillance Evaluation Program (OMSEP) into an improved and more informative tool for medical personnel as well as operators to evaluate the readiness of our workforce. The new version of OMSEP will include better reporting configuration as well as an alignment with the roll out of the new electronic health record or EHR. This will assist CG-1133 in our pursuit of quantitative results that will drive our programs based on where our greatest risks lie.

Environmental Health & Sanitation Program

Centers for Disease Control / Coast Guard
CG-1133 transitioned the Coast Guard to adhere to the new International Health Regulations involving required inspections of our Coast Guard cutters prior to embarkation to overseas ports. CG-1133 obtained Coast Guard compliance with these international regulations from the CDC and is promulgating them throughout the cutter force. This has resulted in better Coast Guard preparedness and compliance with the latest international standards. A new Coast Guard Instruction addressing compliance with this Memorandum of Agreement (MOA) is under draft review.

Industrial Hygiene

Ionizing Radiation
In FY 2010, the Department of Homeland Security's Management Directorate, under the Occupational Safety and Health Manager, established a Departmental Radiation Safety Office. One of the continued directives issued to the components is a comprehensive inventory of any radiation sources that require an NRC-license. Even though all of the radiation sources managed by the Coast Guard are operated under the manufacturer's license of particular equipment, inclusion into the DHS radiation source inventory is still mandated.

Non-Ionizing Radiation

In coordination with CG-1131, a CG Laser System Safety Instruction was developed. With the advent of laser range finders on-board vessel and aviation assets, the need to credential these systems prior to use is extremely important.

Pandemic Influenza Preparedness – Personal Protective Equipment (PPE)

CG-1133, provided oversight in the purchase, storage, assembly and distribution of 2078 Personal Protective Equipment (PPE) Push Packs to 791 units. PPE includes facemasks, respirators, gloves, goggles, garments and hand gel. A Push Pack is a box or container that holds PPE for 5 personnel to use for 30 days. 27 Push Packs were also forward deployed for use during Haiti operations.

To create efficiencies in the logistics management process for the 2009/2010 H1N1 pandemic flu as well as other communicable disease threats/outbreaks and realizing that PPE acquisition and distribution was more appropriately handled outside of CG-1133, a PPE product line is being

created. Working with CG 4-Asset Project Office in Baltimore, under direction of Commandant (CG-113) memo 6260 of September 1, 2009, a PPE product line was established. Subsequently, the contract with TSSI for storage, build, and distribution of PPE push packs was terminated and all PPE materials including assembled push packs were moved to the ALC warehouse.

Lead

Lead-based paint was used in pre-1978 buildings and several of these buildings are occupied by Coast Guard personnel and their family members. Traditionally, management of lead hazards in these buildings has included inspection, risk assessment and abatement of the hazards. Per USEPA and HUD regulations and as part of the management of lead hazard in Coast Guard controlled housing, occupants of the housing units are provided informational pamphlets on management of lead hazards. Additionally, lead inspectors and risk assessors are individually certified in order to perform their duties. While firms that conduct lead abatement were required to be certified, certification of federal agencies were not required. In April 2008, USEPA published a new regulation which impacts the management of lead-based paints in Coast Guard controlled housing. Specifically, the regulation requires federal agencies whose personnel conduct lead renovation to be: (a) certified and (b) use certified lead renovators. CG-1133 released an ALCOAST to disseminate the information to various CG operations on the new requirements. Although a majority of lead abatement and renovation work is contracted out, some renovations are conducted by CG personnel, necessitating the need to have certified renovators. To accomplish this, CG-1133 worked with CG-1223 (Housing) to provide training funds for certification of CG personnel.

Respiratory Protection – Awareness Training

Part of the respiratory protection program under COMDTINST M6260.2D and OSHA under 29 CFR1934 is training of all personnel required to wear respiratory protection while performing their duties. The training is conducted in two parts with the first part providing general information and second part to include selection and fit testing of chosen respirator. The training is required annually or anytime there is a change in facial structure of personnel wearing the respirator. In order to accomplish the 1st part of the training, FC-51 working with CG-1133 developed an online respiratory protection course which was placed on the CG learning portal. The second part of the training, which is a "hands-on" approach, is provided at the Unit Safety training classes and at respective units.

Industrial Hygiene (IH) Database

In order to increase efficiency in tracking exposures to hazards from CG operations, it is necessary to document the exposure's controls are in place. Documentation of exposures allows us to prescribe the right controls. In the past, there has been no central repository; exposure records have been documented and maintained by individual units in no formal structure. In an effort to standardize collection and documentation of exposure data, CG-1133 worked with OSC to source a Commercial Off the Shelf (COTS) data system that can be used for management of Industrial Hygiene data. CG-1133 is working with CG-112 to determine if other databases such as "ImageNow", which CG already has a license for, can be configured to capture IH data.

Coast Guard DSF Stem to Stern Review

The Coast Guard, by direction of the Commandant, has embarked upon a stem to stern review of all Deployable Special Forces (DSF). CG-1133 and CG-112 have participated in weekly meetings and updates that will ultimately provide a road map for the way ahead for DSF. This evaluation is a major evolution for the Coast Guard and safety is playing in integral role and will have input threaded through the entire cycle of this review.

AFLOAT SAFETY

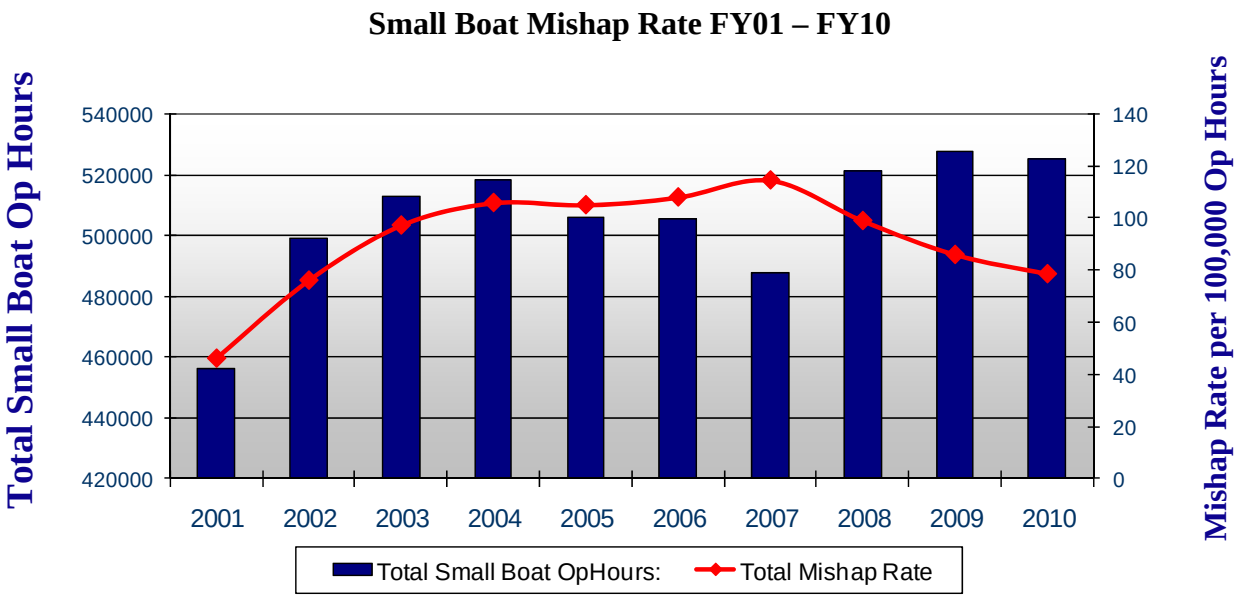

Figure 11

Boat related mishap rates fell in FY10 (See Figure 11) and have steadily declined since 2007. Collisions and groundings mishap rates have declined, although statistically low per the number of total annual boat hours, remain the highest reported boat mishaps. Post 9/11, mishap rates increased due to Ports, Waterways, and Coastal Security mission demand, new boat types, and associated training. The reporting of operational mishaps is the best means of sharing lessons learned to prevent future mishaps as well as identifying any engineering deficiencies.

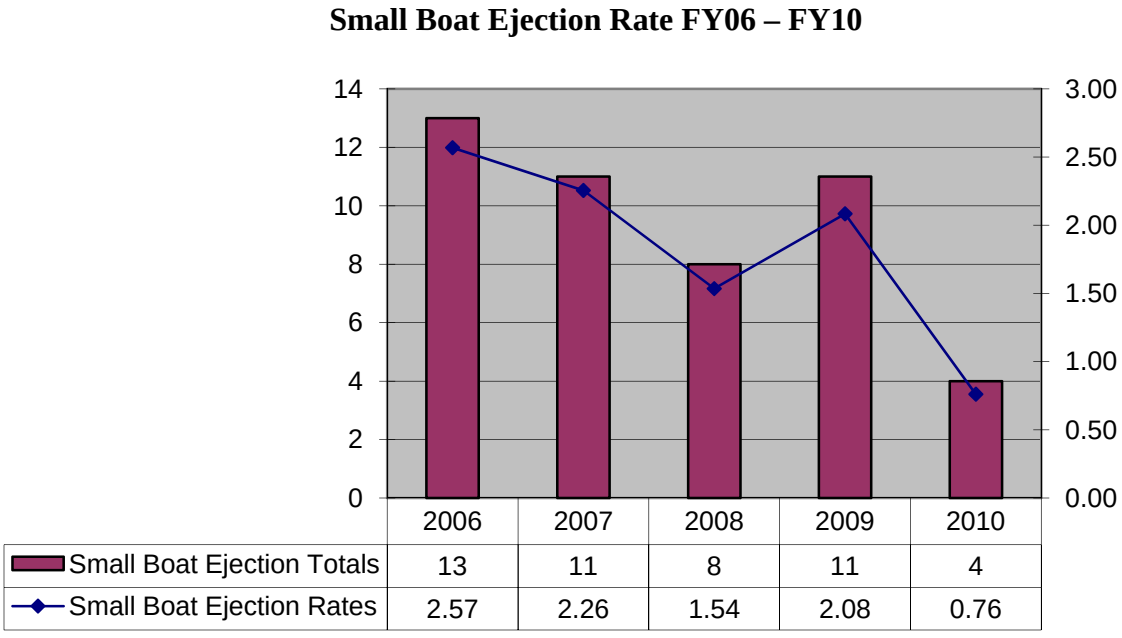

Figure 12

Continued Small Boat Ejection Rate FY06 - FY10

Boat ejection mishap rates (See Figure 12) decreased 33% from 2009 to 2010. The 2010 ejections involved 02 Cutter Boat Medium (CBM), 01 Defender Class (RBS), and 01 TPSB). The Chief, Office of Boat Forces, CG-731, sent an article titled "*Coxswains: Cause for Action*!" in June of 09, to the Master Chief and Gold Badges of the Coast Guard and identified human error as the major cause of ejections. It called for units to tighten up the qualifications for coxswains and hold them responsible for their actions. Reported ejections are discussed at our weekly Boat Forces Tri-Partite meetings.

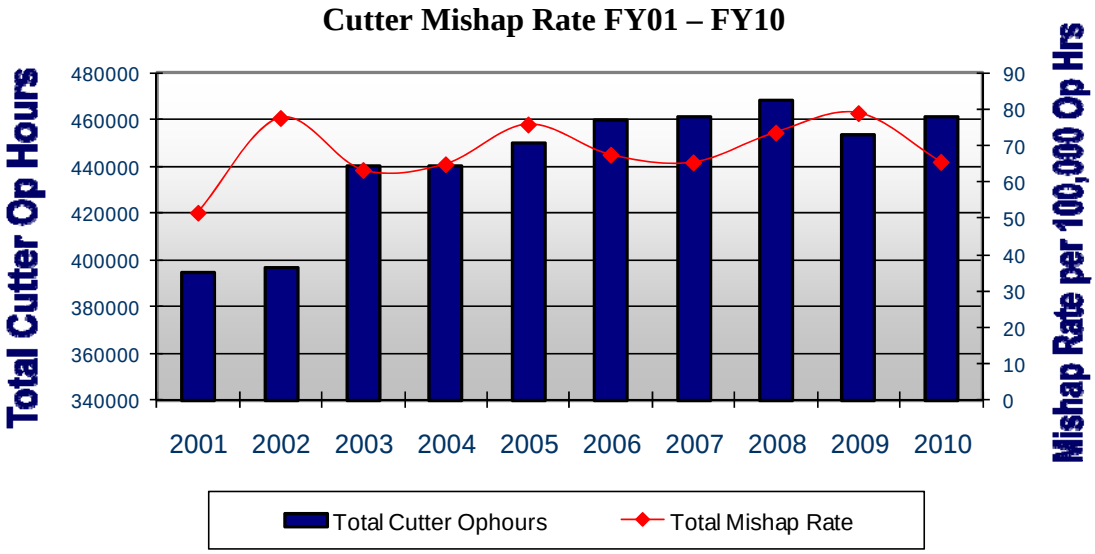

Figure 13

Cutter mishap rates have declined in FY10 (See Figure 13). Operational hours for cutters increased slightly in 2010 and the Total Mishap Rate decreased. This decrease is the result of fewer injuries resulting from slip, trip and falls during Maintenance and Repair periods. This is the result of a greater awareness to the hazards associated with maintenance periods. To bring our threshold limits for reporting mishaps more in-line with DOD, we issued ALCOAST 590/10. It revised cost threshold limit values for all classes of mishaps and, requires that all fires be reported via preliminary message within 12 hours with no minimum property value and all operational Class C, D, and E mishaps be reported within 5 days to the appropriate CG-113 division. These new threshold limits should be reflected in unit pre-mishap plan.

Cutter Mishap Rate FY06 – FY10

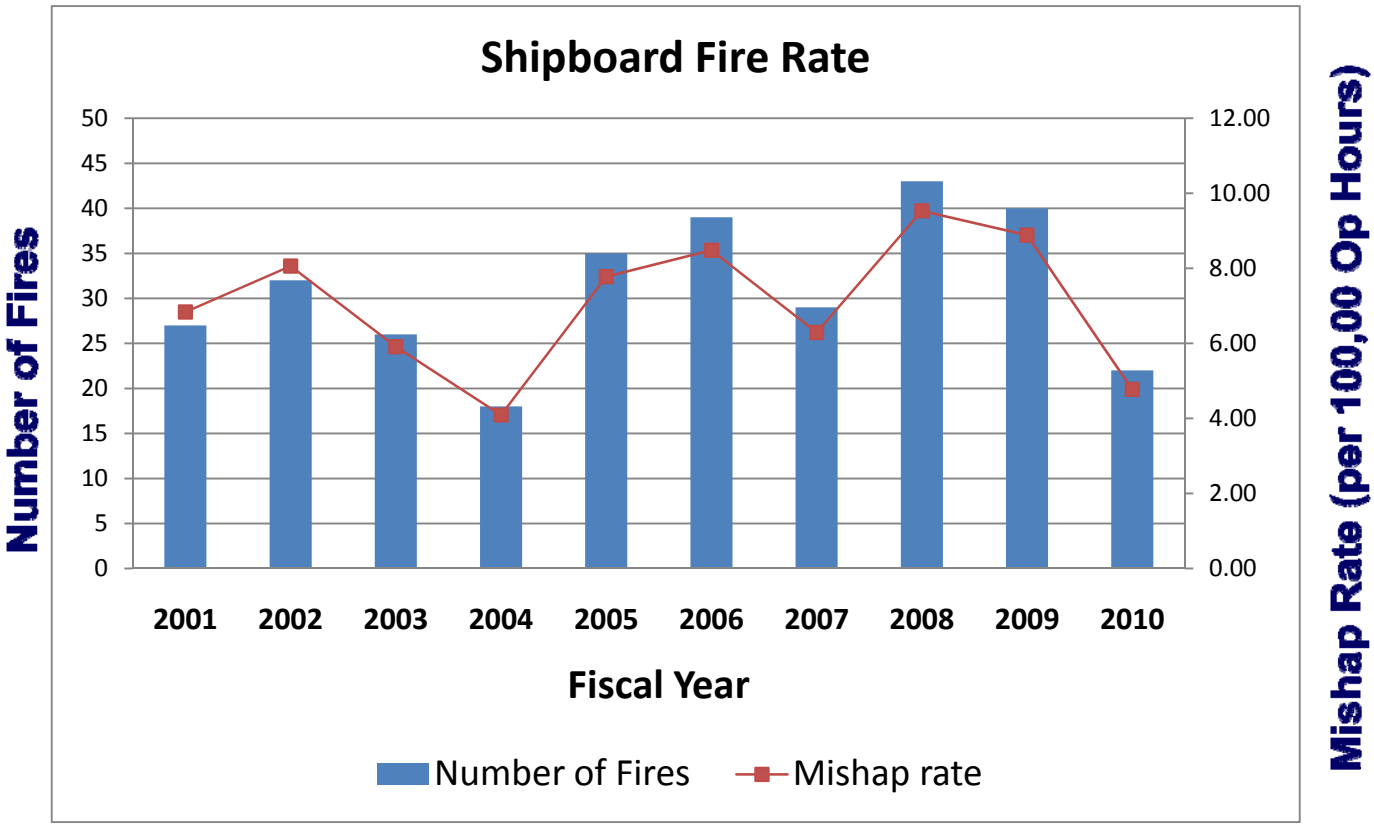

Figure 14

The CGC GALLATIN Class "C" HIPO Final Summary Message (R 291917Z NOV 10), alerted the fleet of the fire hazards associated with shipyard availability and recommended actions to mitigate those fire hazards and improve the fire program. ALCOAST 590/10 requires that all fires onboard cutters be reported via preliminary message to the fleet within 12 hours regardless of cost. This new reporting requirement has increased the awareness of fires that are occurring onboard our cutters and the corrective action being taken to prevent them from reoccurring. Unit input is important as we are using the fire data in FY10 to document the frequency of fires onboard our aging fleet. These reported fires are discussed at our weekly Cutter Forces Tripartite meetings.

TEAM COORDINATION TRAINING (TCT)

BACKGROUND:

The TCT training program increases team effectiveness and minimize human error in cutter, boat and command / control operations and activities. It serves the Active Duty, Reserve and Auxiliary community in accordance with COMDTINST 1541.1. TCT training is a biennial requirement (two years). If more than 24 months have elapsed since the last TCT initial or refresher course, then initial training must be repeated.

Initial training (16 hours) can be satisfied with the successful completion of: POPS Afloat School, OIC/PXO School, Coxswain C-School, Heavy Weather Coxswain School, MLB Coxswain School, and BM-A School, TCT Bridge Resource Management Course, or the TCT Correspondence course.

The TCT program is composed of TCT Facilitators, TCT District Administrators and the Training Quota Management Center (TQC). Operational units request TCT Unit Level training through their respective District Administrator who will then assign a facilitator and forwards the facilitators name to TQC for orders. Personnel interested in facilitating TCT training should contact their respective District Administrator (see below). Active Duty, Reservists, Auxiliarists, and Civilians are all eligible to train as TCT Facilitators but priority will be given to personnel with an operational background. In order to become a TCT Facilitator, members must have attended a TCT course or completed the TCT Correspondence course (G0648). They then must complete the TCT Facilitator course (#500688) and be evaluated instructing at least two TCT Unit Level classes to become a certified facilitator.

UPDATE:

The TCT Cutter OPS course (500686) has recently been renamed the TCT/Bridge Resource Management Course and quotas are now managed by CG-751. This training is recommended for all Cutter Operations Officers and Operations Petty Officers of cutters 65 ft in length or greater. Students should be slated for the operations position, but it is not required.

The number of Active Duty, Reserve, and Auxiliarists receiving exportable, TCT Unit-Level Training was approximately 10,607 for FY10.

Current District TCT Administrators and AREA Training Teams (including work phone numbers) are listed below for reference:

District	Administrator	Email	Work Phone	Fax
D1 DPA	CWO Manny Zambrana	Emmanual.Zambrana@uscg.mil	(212) 668-7992	(212) 668-7975
D5 DPA-SR	CWO Tim Luton	Timothy.M.Luton@uscg.mil	(757) 398-6509	(757) 398-6203
D5 DPA-NR	CWO Sean McGarigal	Sean.McGarigal@uscg.mil	(215) 271-4934	(215) 271-4968
D7 DPA	CWO Ursula Walther	Ursula.W.Walther@uscg.mil	(305) 415-7053	(305) 415-7059
D8 DPA	CWO Jim Todd	James.A.Todd@uscg.mil	(504) 671-2142	(504) 671-2146
D9 DRMC	LCDR Dave Uhl	David.J.Uhl@uscg.mil	(216) 902-6385	(216) 902-6044
D11 DRM	BMCS Stephen Barr	Stephen.L.Barr@uscg.mil	(510) 437-5323	(510) 437-3223
D13 DR	Jeanette Wells	tesseract1@juno.com	(253) 891-0620	(253) 891-0620
D14 DPA	CWO Ryan O'Meara	Ryan.W.Omeara@uscg.mil	(808) 535-3432	(808) 535-3439
D17 DPI	Mr. Mike Folkerts	Michael.R.Folkerts@uscg.mil	(907) 463-2297	(907) 463-2273
LANT TRATEAM	DCC Josh Zirbes	Josh.J.Zirbes@uscg.mil	(757) 641-1232	(757) 391-8100
PAC TRATEAM	LT Jorge Valente	Jorge.L.Valente@uscg.mil	(510) 437-3294	

Current as of 20 September 2011

USCG Safety Program Way Ahead

Risk Reduction Program (RRP)

The Coast Guard is ever adapting to political, resource, and mission challenges that expose members to unknown safety challenges. Adaptive risk management systems capable of identifying and mitigating emerging hazards can reduce risk and prevent mishaps in dynamic operational environments. In 2009, CG-113 stood-up a Risk Reduction Program (RRP) to anticipate and mitigate hazards currently impacting our members in the operational environment. The RRP is changing the current "Reactive" CG safety program to a "Proactive" program. The RRP's innovative methods, processes, and technologies provide effective and adaptive means to capture operational systemic deficiencies before mishaps occur, thus facilitating the development of strong safety cultures in all CG work environments.

In his February 2011 State of the CG Address, Admiral Papp cited the current trend in mishaps as "unacceptable" and stated that "we've got to do something about it." The Risk Reduction Program focuses on leading indicators of operational systems that can predict mishaps, and provides a significant contribution to mishap prevention and risk reduction. The RRP includes innovative analysis methods, processes, and technologies to identify and correct critical capacity deficits in operational systems.

Figure 15 illustrates one initiative under the RRP to transform the current Operational Risk Management (ORM) program into a proactive and dynamic integrated hazard mitigation system. This system leverages existing hazard assessment programs (e.g., Crew Endurance Management (CEM)), Human Factors Analysis and Classification System (HFACS), Operational Hazards Analysis (OHA) and Safety Climate Assessments (column one of the figure) to identify deficient states in operational systems that are hazards to safety, readiness, and mission execution. These hazards are compiled into inventories; in the future every CG mission, evolution, and/or task would have hazard inventory that represents the inherent risk associated with the conduct of the mission, evolution, or task (column two of the figure). During mission planning, operators/planners use the inventories to identify all relevant mission hazards and consider potential mitigation strategies. For all hazards associated with a mission, evolution, and task, the inventories also include the corresponding SPE (severity/probability/exposure) score. Hazards that remain uncontrolled constitute the residual risk. The residual risk score, calculated by subtracting the mitigation SPE from the initial hazard SPE score, reveals risk exposure associated with the mission, evolution, or task. The inventories are reviewed and updated regularly to align with operational realities.

During mission, evolution, or task planning the appropriate inventory is selected for use during the hazard mitigation phase. During hazard mitigation, contextual information regarding the mission, evolution, or task (e.g., weather, time-of-day, crew proficiency, fatigue, platform/equipment status, etc.) is entered into the risk assessment tool (General Assessment of Risk or GAR) along with the residual risk score calculated from the hazard inventory (column three of the figure). The inherent risk associated with the mission, evolution, or task as captured in the hazard inventory residual risk score plus the contextual risk associated with the

environment, crew state, and platform status will equal overall risk for the mission, evolution, or task.

The final, and critical, phase of the Integrated Hazards Mitigation System is dynamic assessment of contextual risk during mission execution. This phase involves not only the responding asset but also command and control support from the unit and/or Sector. The future GAR tool will provide real-time risk exposure assessment capabilities. As the response asset communicates environmental and platform status information, command and control enters the information into GAR and the risk score is updated. Crew fatigue is automatically monitored by the GAR tool and integrated into the risk score. Command and control can alert the response asset when GAR scores near established risk thresholds that require specific actions (e.g., notification of CO/OINC/Sector for authorization to proceed). The monitoring phase requires the consistent and dynamic exchange of information between the response asset and command and control. This interaction will enhance situational awareness and improve decision making by having access to accurate and timely information.

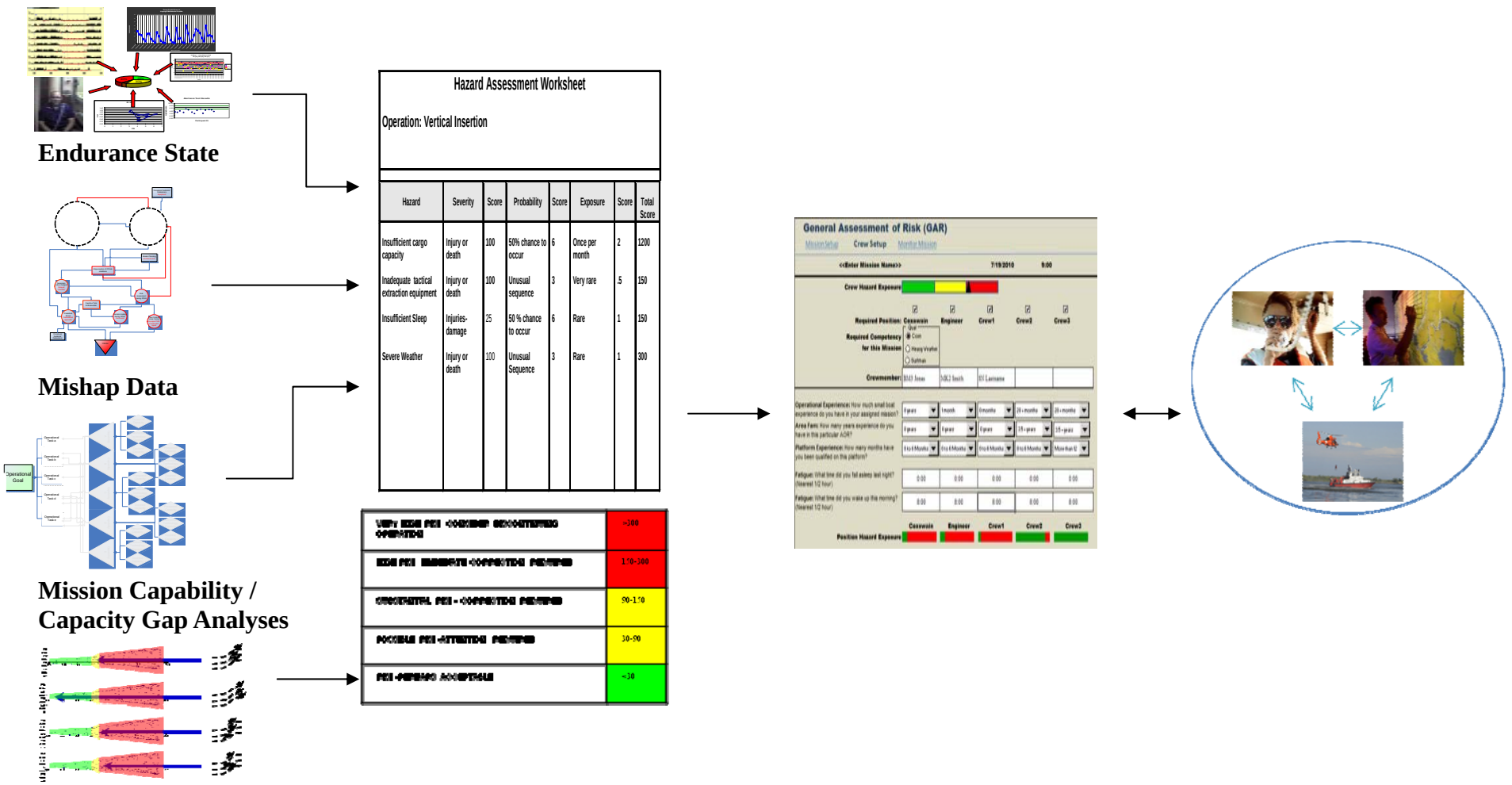

Figure 15

Illustration of an RRP initiative to transform the current Operational Risk Management (ORM) program into a proactive and dynamic integrated hazard mitigation system.

Operational Hazard Analysis (OHA)

We have recently begun to utilize OHA as a framework to better understand our operational risk threats. OHA is a structured analytical environment and framework that facilitates analysis of operations and proactive identification of active and latent hazards in the operational environment. The process involves the identification of mission capabilities necessary to achieve Coast Guard mission objectives, assessment of gaps between Coast Guard capability requirements and existing technology/infrastructure, personnel proficiency, and doctrine capacities. In the context of the OHA framework, capabilities and capacities are defined as:

Capability - refers to the ability of personnel to conduct specific activities (e.g., descend onto a target from a helicopter) during a mission leveraging available written guidance (e.g., TTPs), personnel attributes (e.g., proficiency), and available technology/infrastructure (e.g., helicopter).
Capacity - is the measured degree of congruence between operational requirements and written guidance availability and quality (completeness, accuracy and mission relevance); personnel attributes (experience, training, knowledge, skills, abilities, physical and cognitive traits, and psychological states); and technology/infrastructure characteristics and technical specifications. When combined, capacities form an interactive system resulting in the emergence of operational capabilities.

The OHA is an analytical process that requires quantitative data on the current state of capacities necessary to achieve capabilities to execute a task. These data are captured using subject matter experts (SME) who rate, using standardize scoring procedures, the current developmental state of elements that when aggregated allow capabilities to be realized. For example platform (e.g. H-60) cargo and range represent capacities that when aggregated define the limits of the 'transport' capability. Figure 15 depicts a typical OHA framework that is used to represent the system being analyzed.

Two recent analyses using the OHA process exemplify the potential for this safety analysis methodology and capability to anticipate mishaps. The first analysis was requested by the Coast Guard Safety and Occupational Health Council (SOHC), a council composed of flag officers from CG-1, CG-11, CG-4, CG-5, CG-6, CG-7, and CG-9, to evaluate two operational evolutions (Vertical Insertion (VI) and Hook and Climb (H&C)) currently being conducted by Deployed Special Forces (DSF) units. The second analysis was requested by the Aviation Safety Assessment Action Plan (ASAAP) that was convened to review aviation operations following the rash of mishaps in FY09-10. Each analysis is discussed in detail below.

OHA system analysis framework

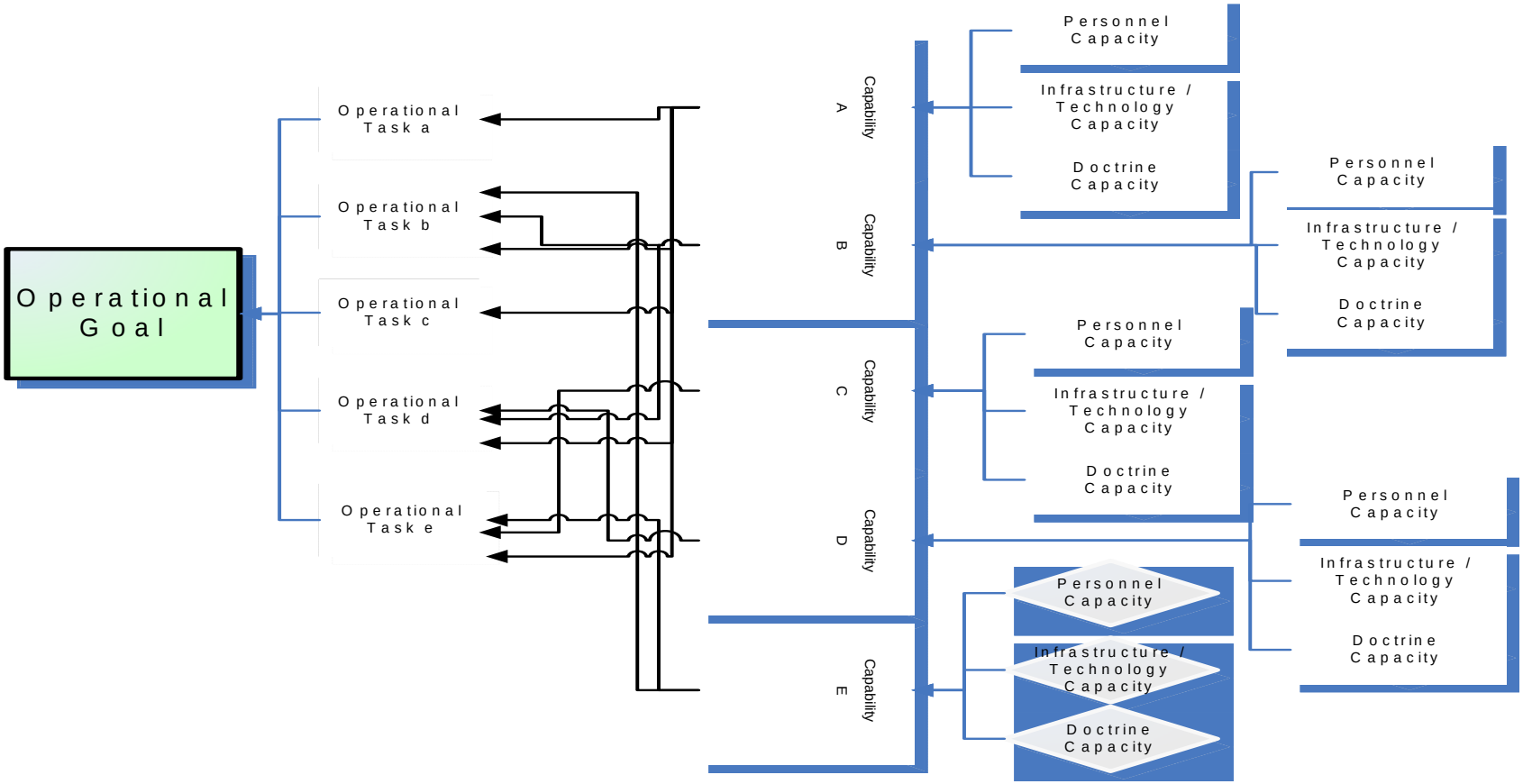

Figure 16

OHA for VI and H&C

Boarding ships is a common and essential mission objective for Coast Guard Maritime Operations. However, conducting covert boarding's requires very specific capabilities currently under development in Coast Guard operations. There are two evolutions supporting the Coast Guard security mission, namely vertical insertion (VI) and hook and climb (H&C) that were targeted for review. In VI, boarding team members slide down a rope from a helicopter onto the deck of the target of interest (TOI). In H&C, boarding team members deploy a hook from a small boat platform onto a railing or other suitable point and use a caving ladder to climb onto a TOI. These evolutions represent new chapters in Coast Guard operations. To address safety and performance concerns, a Tactical and Special Missions Safety Working Group (TSMS-WG), under the auspices of the Coast Guard Safety and Occupational Health Council (CG-SOHC), was established to conduct Operational Hazard Analyses (OHA). The objective of this effort was to identify and assess the current developmental state of capacities and capabilities necessary to safely execute these evolutions.

The OHA process uses a quantitative framework, described earlier, to measure the gap between Coast Guard operational requirements and the current state of capacity development. The larger the capacity gap, the more difficulty personnel will experience executing mission tasks. SME from the Deployed Special Forces (DSF) communities responsible for doctrine, training, and mission execution conducted analyses using standardized procedures and scorecards designed to measure the gaps between operational requirements and current levels of capacity development.

The results of the OHA in 2010 revealed numerous deficiencies in written guidance, personnel, and technology/infrastructure capacity elements that compromise the ability to conduct VI and H&C evolutions in a safe and effective manner. The deficit capacity elements include:

- Platform cargo and egress,
- Training infrastructure, access to both real world environments and static facilities,
- Operational requirements doctrine and TTP specificity,
- Personnel proficiency,
- Physical fitness,
- Medical, physical, and psychological screening,
- Personal protective equipment (PPE), and
- Risk tolerant culture.

The OHA results were briefed to the SOHC who recommended a brief to the Deputy Commandant for Mission Support (DCMS) and Deputy Commandant for Operations (DCO). The DCMS and DCO were briefed on the OHA results and recommended a brief to the Commandant. On 13 October 2009, as the brief to the Commandant was being planned, the Deployable Operations Group (DOG) was conducting H&C training onto the CGC FRANK DREW when an assault team member fell off the caving ladder and drowned. The mishap analysis board (MAB) revealed many of the deficits that were documented in the OHA. The OHA brief did eventually reach the Commandant who ordered a stem-to-stern review of the entire DSF program. The OHA results are being used by the DOG and the stem-to-stern review teams to make changes.

OHA for ASAAP

A rise in CG aviation mishaps, five serious mishaps in six months, raised safety concerns with the CG aviation program. These incidents occurred in routine challenges such as hovering and pattern work, as opposed to more demanding evolutions as might be expected in either night operations or in extreme weather conditions. The increase in mishaps demanded the CG gain a better understanding of the inherent causes to prevent further incidents. An OHA was requested to identify capacity and capability deficits that degrade mission execution. This objective required a comprehensive review of aviation operations.

In an attempt to focus the OHA, the CG-113 analysis team conducted a review of recent aviation mishaps to detect common elements or recurring themes. While no common causal or contributory threads were revealed, aviation risk assessment (RA) activities came into question in a number of the mishaps. Given the critical nature of RA for the safe execution of any mission, the OHA was focused on the aviation RA program.

The RA-OHA revealed that CG aviation uses an on-the-job-training (OJT)-centric system to develop RA proficiency. The historically low mishap rates justified this approach. Traditional CG aviation missions of LE and SAR present a limited set of evolutions that are well within the RA development tolerance thresholds of an OJT-centric system. Prior to the expansion of the aviation mission scope, operational scenarios were limited to the variations included in SAR and LE missions. Exposure to real-world operations was frequent, increasing the likelihood that inexperienced pilots would be paired in the cockpit with very proficient aviators. However, recent expansion of aviation missions (e.g. AUF, RWAI, etc.) has increased RA proficiency requirements and reduced the likelihood of being paired with very proficient aviators since they are being distributed to new missions. In addition, the introduction of new platforms and flight management systems increase the demand for training/operational flight hours, and reduce exposure to experienced aviators. These additional demands on an OJT-centric RA proficiency system, developed to manage and sustain a stable two mission portfolio, is creating mounting uncertainty on the development of RA proficiency.

To sustain the multi-mission demands on the current system, as well as technology/infrastructure upgrades, CG aviation must adopt a more formal RA proficiency development system. This formal system will reduce the sole reliance on flight hours and mentoring from very experienced aviators to grow RA proficiency. The formal RA system will rely on growing proficiency in the capabilities to identify, assess, mitigate and monitor hazards. Proficiency in these skills will be developed early in the aviator's career and honed with exposure to operational scenarios. Additionally, awareness of the system elements and their interaction (e.g., flight hours and platform maintenance) that contribute to RA development are essential to manage RA proficiencies. RA system analysis tools, already in development, will assist units in managing the influence and interaction of the various elements that constitute operational complexity for each individual mission. These tools will leverage system analysis methodologies and provide users with a dynamic dashboard output on the status of operational elements, hazards, and associated consequences.

An additional benefit of a formal RA development is the standardization of a RA process that is common across the entire aviation community. Currently, there is no standard process for RA so

each unit may conduct RA differently using different analysis outputs to make risk versus gain decisions. These differences are particularly salient during joint operations when individual unit RA results do not agree.

Formal RA Tool – Redesign General Assessment of Risk (GAR) Tool

The most common tool used by the CG to assess risk is the General Assessment of Risk (GAR), or otherwise known as Green, Amber, Red. This tool requires the user to rate various elements (e.g., crew selection, crew fitness, planning/communications, supervision, environment, and mission complexity) associated with a mission or evolution on a scale of 0 to 10, where 0 denotes 'no risk' and 10 signifies 'maximum risk'. The aggregate score for the six elements denotes the risk associated with the mission. Scores between 0 and 23 are considered low risk and coded as 'Green'. Scores between 24 and 44 denote moderate risk and coded as 'Amber'. Scores between 45 and 60 are considered high risk and coded as 'Red'. There are three primary deficiencies with the GAR tool. The first deficiency is that the composite score can misrepresent the true exposure to risk and lead the user into a false sense of security. For example, a crew that

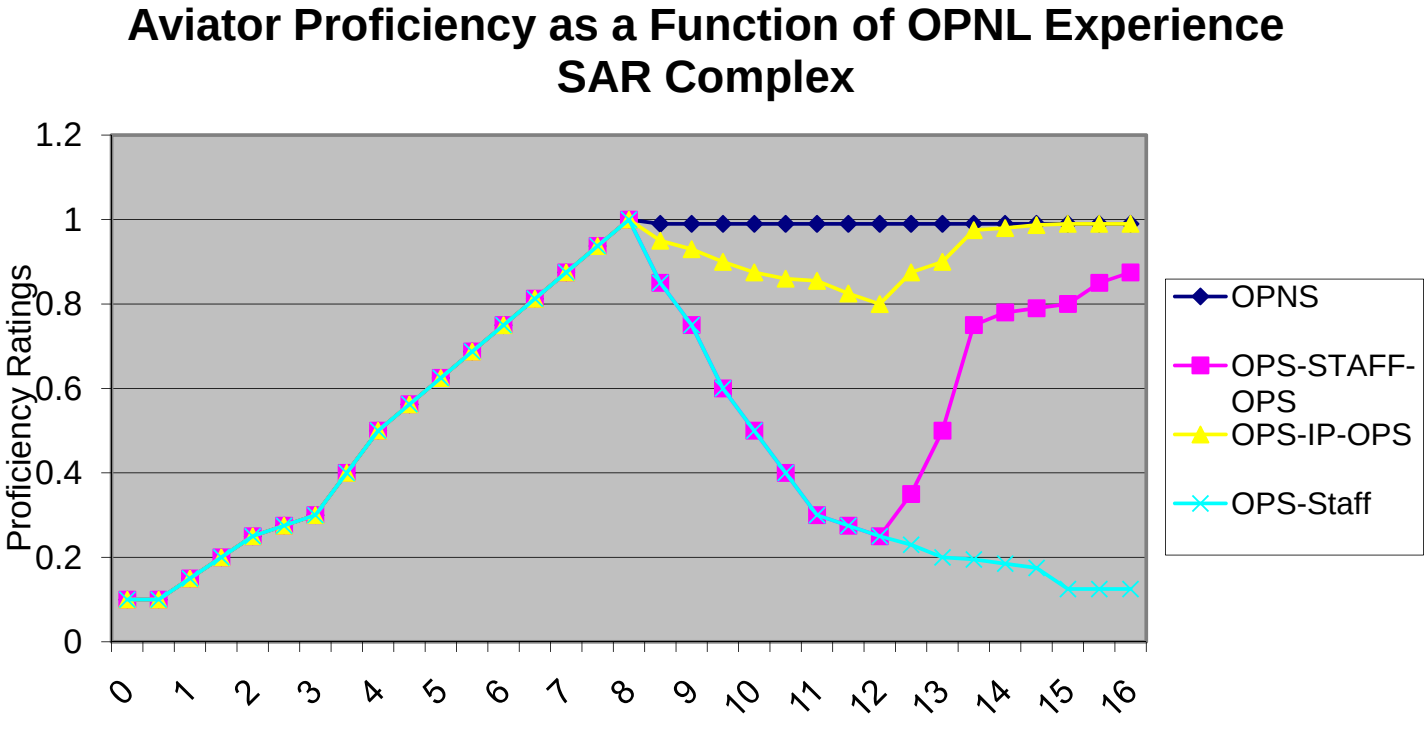

Figure 17 Aviator operational experience over time

has not slept in 24 hours would rate 'crew fitness' as 10 but if the remaining 5 elements on the GAR were ideal and scored a 1, the composite score would be 15 and the mission would be classified as 'Green'. However, a mission where the crew has not slept in 24 hours should be classified as 'Red,' not 'Green'. The GAR assessment underestimates the risk associate with this example mission scenario. The second deficiency with GAR is the subjective nature of the

scores for the elements. Quite often these estimates are shots in the dark due to lack of awareness, or in the worst case, deliberate manipulation of scores to influence the 'go/no go' decision for the mission/evolution. The third deficiency is the currency of the GAR assessment as the mission progresses. As per the ORM COMDTINST, the GAR assessment must be updated if mission characteristics change that could impact risk exposure. Unfortunately, GAR assessments are rarely updated after the mission progresses and this exposes operational assets to unknown or unrecognized hazards.

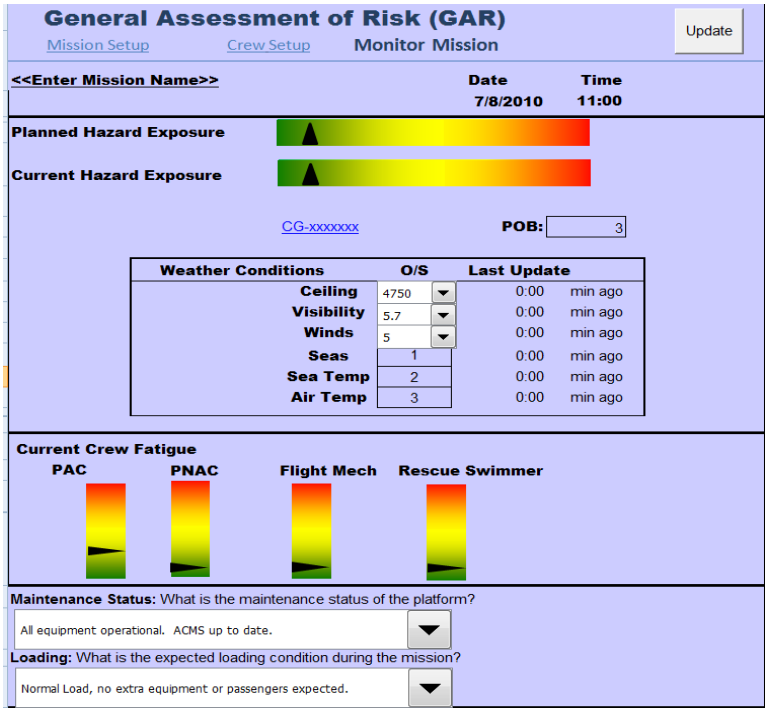

Figure 18 Monitor mission screen of the Aviation GAR tool.

To address these deficiencies, a modified GAR tool is under development that replaces the composite score with a framework that evaluates each of the GAR elements within a systems analysis complex. To reduce the subjectivity of GAR scores, proficiency or development trend lines are being developed with SMEs for those GAR elements that can be quantified. For example, currently when assessing the element 'crew selection' the member must juggle cognitively the proficiency and development of the crew and then assign a score of 0 to 10 to represent the risk. A more accurate approach is to develop operational proficiency trend lines for each crew member. The figure above (Figure 17) illustrates a typical proficiency trend. Preliminary efforts to develop trend lines reveal that most individuals develop at similar rates. Using the example above, if one knows the number of years that individual has in the CG or their particular rate, one can estimate their level of operational proficiency and enter that rate into the calculation for the crew selection score. The final benefit to this tool is that since it runs on a software engine there are numerous functions that update dynamically as the mission progresses. For example, crew fatigue is monitored dynamically as the mission progresses. The tool considers sleep length, time-of-day, and length of the mission to estimate the psychophysical state of the crew. Since the software runs on the standard workstation, the GAR analysis can be updated as the mission progresses by shore based communication personnel and results relayed to the responding asset.

Figure 18 above shows a screenshot of the GAR tool being developed. Currently there are beta versions for small boat and aviation operations. Field testing is underway to exercise the tool and refine as necessary.

CONTACT INFO

Your comments on this report including recommended content, as well as any suggestions concerning the safety of maritime operations will always be greatly appreciated. Please feel free to call, fax, or e-mail us with any comments, questions or concerns.

SAFETY POINTS OF CONTACTS:

Office of Safety and Environmental Health (COMDT CG – 113)
Chief, CDR Joel Rebholz (202) 475-5200 (Acting)
http://www.uscg.mil/hq/cg1/cg113/

Aviation Safety Division (COMDT CG – 1131)
Division Chief, CDR Joel Rebholz (202) 475-5200
http://www.uscg.mil/hq/cg1/cg113/cg1131/

Shore & Sector Operational Safety Division (COMDT CG – 1132)
Division Chief, CDR Laura Weems (202) 475-5216
http://www.uscg.mil/hq/cg1/cg113/cg1132/

Environmental Health and Industrial Hygiene Division (COMDT CG – 1133)
Division Chief, CDR Melburn Dayton (202) 475-5210
http://www.uscg.mil/hq/cg1/cg113/cg1133/

Afloat Safety Division (COMDT CG – 1134)
Division Chief, CDR Richard Hartley (202) 475-5215
http://www.uscg.mil/hq/cg1/cg113/cg1134/