



Maritime Search and Rescue (MSAR) Helicopter Capability of the Philippine Coast Guard

Rowene G. Colita, MCDRRM

University of Baguio
20209886@s.ubaguio.edu1

Warren G. Moyao, PhDCJ

University of Baguio
warren.moyao@e.ubaguio.edu

Abstract: Maritime Search and Rescue (MSAR) operations involve the use of helicopters to locate, rescue, and help individuals in distress at sea or in maritime environments. MSAR helicopters play a critical role in maritime emergency response, providing swift and efficient search and rescue capabilities in challenging and dynamic environments. Hence, this study assessed the Maritime Search and Rescue (MSAR) helicopter capability of the Philippine Coast Guard (PCG) by evaluating its readiness condition in terms of personnel, training, and equipment. The study further identifies the gaps that hinder the PCG's MSAR helicopter capability from fulfilling the ideal MSAR helicopter readiness based on The International Aeronautical and Maritime Search and Rescue Manual (IMSAR) 2016 edition. The research adopts a descriptive approach using a survey as the primary data collection tool. The survey was conducted among 100 respondents, and the findings provided valuable insights into the perceptions of personnel regarding the readiness and adequacy of the PCG's MSAR helicopter capability. The findings highlight the importance of addressing personnel shortages, fostering international training collaboration, and investing in modern and suitable equipment.

Keywords: Helicopter Capability, Maritime Search and Rescue, Readiness, Philippine Coast Guard.

INTRODUCTION

The MSAR helicopter capability plays a crucial role in safeguarding lives and ensuring effective response to maritime emergencies (Civil Aviation Authority, 2021). The PCG is responsible for executing search and rescue operations in Philippine waters, including the deployment of MSAR helicopters (Philippine Coast Guard, 2022). As maritime incidents and accidents continue to pose risks, it is vital to assess the readiness of the PCG's MSAR helicopter capability in terms of personnel, training, and equipment. By identifying any gaps that hinder the achievement of ideal MSAR helicopter readiness, the PCG can enhance its response capabilities and improve the effectiveness of search and rescue operations.

The research problem addressed in this study is the need to evaluate the readiness condition of the PCG's MSAR helicopter capability and identify the gaps that prevent it from fulfilling the ideal MSAR helicopter readiness as outlined in the IMSAR 2016 edition. By examining the factors of personnel, training, and equipment, this research aims to provide insights into areas where improvements are necessary to enhance the PCG's MSAR capabilities.

Literature Review

MSAR operations can use helicopters, particularly in the last stages of a maritime rescue (National MSAR Board, 2003). Due to its slow speed and hovering capabilities, it is a perfect search and rescue unit (SRU) for searching for small objects at sea. The helicopter's ability to land in restricted spaces and operate from ships enables it to assist survivors before surface SRUs get on the site. They are also suitable for rescue operations in rough seas or regions where surface facilities cannot operate.

Maritime Search and Rescue helicopters are typically deployed aboard Air Capable Vessels (ACVs), which are subject to hazardous flying scenarios due to the dangerous maritime environment in which they operate. Due to the ship's superstructure, low visibility, and changing flight deck, shipboard helicopter operations (HELPS) are among the most challenging, training-intensive, and dangerous of all helicopters flying missions (National MSAR Board, 2003).

Maritime Search and Rescue (MSAR) operations involve the use of helicopters to locate, rescue, and help individuals in distress at sea or in maritime environments. MSAR helicopters play a critical role in maritime emergency response, providing swift and efficient search and rescue capabilities in challenging and dynamic environments. The literature on MSAR helicopter capability encompasses various aspects, including personnel qualifications, training requirements, equipment specifications, operational procedures, and international guidelines.

The International Aeronautical and Maritime Search and Rescue Manual (IMSAR)

The International Aeronautical and Maritime Search and Rescue Manual (IMSAR) serves as a comprehensive reference document for search and rescue operations worldwide. Published by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), the manual provides guidelines and best practices for conducting effective search and rescue missions. The IMSAR manual outlines standards and recommendations for MSAR helicopter capability, covering areas such as personnel qualifications, training programs, equipment requirements, and operational coordination.

The three volumes of the International Aeronautical and Maritime Search and Rescue Manual help States fulfill their SAR obligations under the Convention on International Civil Aviation, the International Convention on Maritime Search and Rescue, and SOLAS. These volumes outline a common aviation and maritime SAR service organization. States are urged to create and strengthen their SAR systems, cooperate with neighboring States, and consider them part of a global SAR system.

Each IAMSAR Manual volume addresses particular SAR system duties and can be used alone or with the other two volumes to get a complete picture of the SAR system. The duties may require one, two, or all three volumes. The Organization and Management volume (volume I) discusses the global SAR system concept, establishment and improvement of national and regional SAR systems, and cooperation with neighboring States to provide effective and economical SAR services; the Mission Co-ordination volume (volume II) assists personnel who plan and co-ordinate SAR operations and exercises; and the Mobile Facilities volume (volume III) is intended to be carried aboard rescue units, aircraft, and other.

Assessing Readiness in MSAR Helicopter Capability

Assessing the readiness of MSAR helicopter capability is crucial to ensure optimal response capabilities in maritime emergencies. Readiness assessments involve evaluating various factors, including personnel readiness, training effectiveness, and equipment suitability. Studies have emphasized the importance of having an adequate number of qualified personnel, well-trained pilots and crews, and reliable and well-maintained helicopters equipped with the necessary technologies and systems. Assessing readiness provides insights into strengths and weaknesses, enabling organizations to identify areas for improvement and allocate resources effectively.

Identifying Gaps in MSAR Helicopter Readiness

Identifying gaps in MSAR helicopter readiness involves examining discrepancies between the current state of capability and the desired or ideal readiness level. Gaps can manifest in personnel shortages, insufficient training programs, outdated or inadequate equipment, and inconsistencies with international standards or guidelines. Identifying these gaps helps organizations prioritize interventions and investments to enhance MSAR capabilities. Studies have highlighted the significance of addressing gaps to improve response times, increase effectiveness in rescue operations, and ensure the safety of both rescue personnel and survivors.

The literature review highlights the importance of MSAR helicopter capability and the need to assess readiness and identify gaps. It underscores the role of international guidelines, such as the IMSAR manual, in providing a benchmark for evaluating and improving MSAR capabilities. By reviewing relevant literature, this study aims to build upon existing knowledge and contribute to the understanding of the PCG's MSAR helicopter capability, its readiness condition, and the gaps that need to be addressed to enhance its effectiveness in maritime search and rescue operations.

Objectives of the Study

This study holds significant implications for the maritime safety and rescue operations conducted by the PCG. By assessing the readiness condition of the MSAR helicopter capability, the findings will shed light on strengths and weaknesses in personnel, training, and equipment, allowing the PCG to focus on areas that require improvement. The identification of gaps in relation to IMSAR guidelines will provide a benchmark for the PCG particularly the Coast Guard Aviation Force (CGAF) to align its practices with international standards, thereby enhancing interoperability and coordination with other maritime search and rescue entities. Ultimately, this research aims to contribute to the PCG's efforts to improve their MSAR helicopter capability and ensure more efficient and effective responses to maritime emergencies.

This research focuses specifically on the MSAR helicopter capability of the Philippine Coast Guard. The study will examine the readiness condition in terms of personnel, training, and equipment, based on the perceptions of respondents involved in MSAR operations. The research will utilize a survey as the primary data collection tool, targeting 100 respondents with relevant expertise and involvement in MSAR operations. However, it is important to note that the study has limitations, including the potential for respondent bias and the inherent subjectivity of survey-based data. Additionally, the research is descriptive and does not explore the implementation or effectiveness of specific interventions to address the identified gaps.

METHODOLOGY

This study adopted a descriptive research design to assess the readiness condition of the Philippine Coast Guard's (PCG) Maritime Search and Rescue (MSAR) helicopter capability. Descriptive research aims to provide an accurate portrayal of the characteristics, conditions, or opinions of a specific population. In this case, the research seeks to gather data on the perceptions of personnel involved in MSAR operations regarding the readiness and adequacy of personnel, training, and equipment.

The primary data collection method utilized in this study is a survey. Surveys are an effective tool for gathering information from a large number of respondents in a structured manner. The survey questionnaire was designed to capture the perceptions and opinions of individuals who have direct involvement or expertise in MSAR helicopter operations within the PCG.

The population of this study comprises of individuals within the PCG who are involved in or knowledgeable about MSAR helicopter operations. A purposive sampling technique was employed to select a sample of 100 respondents who met the criteria. The sample included personnel from different ranks, such as pilots, crew members, and rescuers, ensuring a diverse representation of perspectives.

The survey questionnaire was developed based on the research objectives and focused on assessing readiness in terms of personnel, training, and equipment. The questionnaire consisted of items

designed to measure the respondents' perceptions of various indicators related to MSAR helicopter capability. Likert scale questions were utilized, allowing respondents to rate their level of agreement or disagreement with specific statements. The survey instrument underwent a pilot test to ensure clarity and validity before being administered to the selected respondents.

After the survey data was collected, it underwent a process of analysis to derive meaningful insights. Statistical analysis techniques were applied to interpret the data and assess the readiness condition of the PCG's MSAR helicopter capability. Descriptive statistics, including means and standard deviations, were computed to summarize the respondents' perceptions regarding the adequacy of personnel, training, and equipment. These statistical measures provided quantitative indicators of the readiness level and identified areas of concern.

Ethical considerations were given due attention throughout the research process. Informed consent was obtained from all participants before they participated in the survey. Confidentiality and anonymity were ensured by not collecting any personally identifiable information. The research adhered to ethical guidelines and complied with relevant data protection regulations.

RESULTS AND DISCUSSIONS

The results of the survey provide valuable insights into the perceptions of the respondents regarding the readiness condition of the PCG's MSAR helicopter capability in terms of personnel, training, and equipment. The following subsections outline the findings for each aspect.

Personnel Readiness

Regarding personnel readiness, the respondents were asked nine questions to rate. Of these numbers, the respondents rate the adequacy of the number of rescuers available to perform MSAR operations the least. The findings reveal that respondents disagreed with the statement, indicating that they perceive a shortage in the number of rescuers available for MSAR operations. The mean result was 2.92, with a standard deviation of 0.64.

Table 1. Personnel Readiness

	PERSONNEL	Mean	SD	Descriptive Interpretation
A	Pilots	3.19	0.58	Agree
1	Qualified pilots are available to perform MSR	3.49	0.52	Strongly Agree
2	Trained pilots are available to conduct MSR	3.41	0.60	Strongly Agree
3	An adequate number of qualified pilots are available to perform MSR	2.73	0.81	Agree
B	Crews	2.89	0.69	Agree
4	Qualified crews are available to perform MSR	3.07	0.69	Agree
5	Trained crews are available to conduct MSR	3.11	0.55	Agree
6	An adequate number of trained crews are available to perform MSR	2.58	0.89	Agree
C	Rescuers	2.67	0.86	Agree
7	Qualified rescuers are available to perform MSR	2.87	0.70	Agree
8	Trained rescuers are available to conduct MSR	2.60	0.91	Agree
9	An adequate number of rescuers are available to perform MSR	2.54	0.87	Agree
	Over-all Mean	2.92	0.64	Agree

However, when it comes to the indicators of qualified pilots being available and trained pilots being available to perform MSAR operations, the respondents strongly agreed. The mean result for qualified pilots was 3.49, and for trained pilots, it was 3.41. These findings suggest that the respondents perceive an adequate availability of qualified and trained pilots for MSAR helicopter operations.

The findings regarding personnel readiness indicate a perceived shortage in the number of rescuers available for Maritime Search and Rescue (MSAR) operations within the Philippine Coast Guard (PCG). This shortage may have implications for the PCG's ability to effectively respond to maritime emergencies and conduct timely rescues. While the availability of qualified and trained pilots was perceived positively by the respondents, addressing the shortage of rescuers should be a priority to ensure sufficient manpower for MSAR operations.

Training Readiness

In terms of training readiness, the respondents' perceptions were assessed regarding participation in MSAR exercises with other countries. The results indicate that the respondents disagreed with the statements related to pilots, crews, and rescuers attending MSAR exercises with other countries. The mean score for pilots attending MSAR exercises was 2.42, for crews attending MSAR exercises it was 2.39, and for rescuers attending MSAR exercises, it was 2.44. These findings suggest that there is a perceived gap in terms of international training collaboration and participation in joint exercises.

Table 2. Training Readiness

	TRAINING	Mean	SD	Descriptive Interpretation
A	Individual Training	2.91	0.64	
1	MSAR training for pilots focuses on improving their knowledge, skills, and attitudes to ensure the safety of MSAR helicopter operations.	3.26	0.52	Agree
2	Training for pilots to perform their individual tasks during MSAR missions is adequate.	2.98	0.70	Agree
3	Pilot training is sustainable within the means of the CGAF or the PCG.	2.98	0.68	Agree
4	MSAR training for crews focuses on improving their knowledge, skills, and attitudes to ensure the safety of MSAR helicopter operations.	3.04	0.68	Agree
5	Training for crews to perform their individual tasks during MSAR missions is adequate.	2.95	0.70	Agree
6	Crew training is sustainable within the means of the CGAF or the PCG.	2.87	0.82	Agree
7	MSAR training for rescuers focuses on improving their knowledge, skills, and attitudes to ensure the safety of MSAR helicopter operations.	2.96	0.72	Agree
8	Training for rescuers to perform their individual tasks during MSAR missions is adequate.	2.58	0.88	Agree
9	Rescuers' training is sustainable within the means of the CGAF or the PCG.	2.59	0.91	Agree
B	Unit or Team Training	2.68	0.76	Agree
10	The pilots receive team training to perform MSAR responsibilities that are coherent and synergistic with the performance of crews and rescuers.	2.76	0.75	Agree
11	Pilots participate in regular team training with MSAR crews and rescue personnel.	2.61	0.93	Agree
12	The CGAF or PCG sustains and supports the Pilots' team training with crew members and rescue personnel.	2.68	0.89	Agree
13	The crews receive team training to perform	2.86	0.85	Agree

	MSAR responsibilities that are coherent and synergistic with the performance of pilots and rescuers.			
14	Crews participate in regular team training with MSAR pilots and rescue personnel.	2.56	0.86	Agree
15	The CGAF or PCG sustains and supports the crews' team training with pilots and rescue personnel.	2.81	0.88	Agree
16	The rescuers receive team training to perform MSAR responsibilities that are coherent and synergistic with the performance of pilots and crews.	2.51	0.89	Agree
17	Rescuers participate in regular team training with MSAR pilots and crew.	2.55	0.89	Agree
18	The CGAF or PCG sustains and supports the rescue personnel's team training with pilots and crew.	2.81	0.84	Agree
C	Exercises	2.67	0.66	Agree
19	Pilots attend MSAR exercises with other PCG units.	3.00	0.64	Agree
20	Pilots attend MSAR exercises with other Philippine agencies.	2.75	0.70	Agree
21	Pilots attend MSAR exercises with other countries.	2.42	0.85	Disagree
22	Crews attend MSAR exercises with other PCG units.	2.70	0.77	Agree
23	Crews attend MSAR exercises with other Philippine agencies.	2.58	0.85	Agree
24	Crews attend MSAR exercises with other countries.	2.39	0.79	Disagree
25	Rescuers attend MSAR exercises with other PCG units.	2.90	0.67	Agree
26	Rescuers attend MSAR exercises with other Philippine agencies.	2.70	0.80	Agree
27	Rescuers attend MSAR exercises with other countries.	2.44	0.80	Disagree
28	Rescuers attend MSAR exercises with other PCG units.	2.83	0.67	Agree
	Over-all Mean	2.75	0.66	Agree

The survey results reveal a perceived gap in terms of training collaboration and participation in MSAR exercises with other countries. International training collaboration plays a vital role in enhancing interoperability and sharing best practices among different maritime search and rescue entities. The findings suggest that the PCG could benefit from increased participation in joint exercises with other countries to improve training effectiveness and foster cooperation in MSAR operations. Strengthening international training partnerships would contribute to the overall readiness of the PCG's MSAR helicopter capability.

Equipment Readiness

The respondents' perceptions regarding equipment readiness were also assessed. The findings reveal that the respondents strongly disagreed with the indicators related to helicopter endurance, payload capacity, auto hover system, search pattern autopilot modes, enhanced ground proximity warning

systems (EGPWS), and night capabilities. The mean scores for these indicators were 3.30, 3.37, 3.43, 3.47, and 3.45, respectively. These results suggest that the respondents perceive limitations in the practicality, functionality, and capability of the current equipment for MSAR helicopter operations.

Table 3. Equipment Readiness

	EQUIPMENT	Mean	SD	Descriptive Interpretation
A	Platform	3.36	0.51	Strongly Agree
1	The helicopter in the inventory of CGAF is suitable for MSAR operations.	3.23	0.85	Agree
2	The helicopter endurance is practical for ship-based MSAR helicopter operations.	3.30	0.58	Strongly Agree
3	The helicopter platform can accommodate the necessary payload for MSAR operations.	3.37	0.65	Strongly Agree
4	The helicopter has a fully integrated auto hover system and search pattern autopilot modes.	3.43	0.61	Strongly Agree
5	The helicopter has enhanced ground proximity warning systems (EGPWS)	3.47	0.73	Strongly Agree
6	The helicopter is night capable with night vision imaging systems (NVIS) and forward-looking infrared systems.	3.45	0.73	Strongly Agree
B	Sensors	3.02	0.60	Agree
7	Sensors are available to detect targets at sea in adverse conditions.	2.98	0.64	Agree
8	Sensors are powerful enough to identify targets at sea in adverse conditions, even at nighttime.	3.03	0.66	Agree
9	Sensors can locate emitted emergency transmissions from targets.	3.04	0.62	Agree
C	Mission Essential Equipment	3.21	0.47	Agree
10	Availability of dual hoists for hoisting with corresponding rescuer and victim harnesses, and rescue litter	2.61	0.82	Agree
11	Availability of a cargo hook with an appropriate rescue basket	3.17	0.78	Agree
12	Availability of helicopter flotation system	3.47	0.69	Strongly Agree
	Over-all Mean	3.21	0.47	Agree

The results of the survey highlight certain areas of concern in the readiness condition of the PCG's MSAR helicopter capability. While there is a perception of an adequate number of qualified and trained pilots, there are perceived gaps in terms of the availability of rescuers, international training collaboration, and the suitability of equipment for MSAR operations. These findings provide valuable insights for further analysis and discussion in the subsequent chapters, enabling the identification of gaps that hinder the PCG's MSAR helicopter capability from fulfilling the ideal MSAR helicopter readiness based on IMSAR guidelines.

The respondents strongly disagreed with the indicators related to equipment readiness, indicating concerns about the practicality, functionality, and capability of the current equipment for MSAR helicopter operations. The findings suggest that improvements are needed in several areas, including helicopter endurance, payload capacity, auto hover system, search pattern autopilot modes, enhanced ground proximity warning systems (EGPWS), and night capabilities. Addressing these equipment-related gaps is crucial to ensure that MSAR helicopter operations are conducted safely and efficiently.

Comparison to IMSAR Guidelines

To fully evaluate the readiness condition of the PCG's MSAR helicopter capability, it is essential to compare the survey findings to the guidelines outlined in IMSAR. By aligning with international standards, the PCG can enhance its interoperability and coordination with other search and rescue entities.

Based on the survey results, it is evident that certain gaps exist between the perceived readiness condition and the ideal MSAR helicopter readiness based on IMSAR guidelines. These gaps include the shortage of rescuers, limited international training collaboration, and concerns about equipment capabilities. Addressing these gaps will require strategic interventions, such as recruiting and training additional rescuers, fostering international training partnerships, and investing in modern and suitable equipment.

CONCLUSIONS

The findings of the survey provide valuable insights into the readiness condition of the PCG's MSAR helicopter capability. In terms of personnel readiness, there is a perceived shortage of rescuers available for MSAR operations, although the availability of qualified and trained pilots was perceived positively. Regarding training readiness, there is a perceived gap in terms of international training collaboration and participation in joint MSAR exercises. In terms of equipment readiness, concerns were raised about the practicality, functionality, and capability of the current equipment for MSAR helicopter operations.

This study provides insights into the readiness condition of the PCG's MSAR helicopter capability and identifies gaps that hinder its fulfillment of the ideal MSAR helicopter readiness based on IMSAR guidelines. The findings highlight the importance of addressing personnel shortages, fostering international training collaboration, and investing in modern and suitable equipment.

It is important to recognize that this study focused on a specific aspect of the PCG's helicopter search and rescue capabilities and was based on the perceptions of a limited sample size. Further research and evaluation are encouraged to provide a more comprehensive understanding of the PCG's overall MSAR capabilities and to address other aspects that may impact the effectiveness of their search and rescue operations.

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