

## Study and Analysis on the Recruitment and Training Modes of Civil Helicopter Rescuers

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**Abstract.** This article focuses on the standardized recruitment and training of civil helicopter rescuers. By giving a comparable study on the existing recruitment and training methods adopted domestically and internationally, the article takes into account the industry's characteristics and its development demands and conducts studies on the recruitment and training modes of civil helicopter rescuers. The study intends to shed light on improving the development of civil helicopter rescuers' team and on promoting standardized management of the rescue flying team.

### Introduction

Due to its advantages of high maneuverability, good performance, wide rescue range and the possibility of conducting operations in extremely complicated sea conditions, helicopter rescue has been widely recognized as an important rescue means. In order to further improve the development of the flying rescue team, the article discusses the possibility of increasing investment and establishing a comprehensive marine rescue network. To develop a rescue flying team with scientific structure, reasonable deployment and strong expertise, this article addresses the recruitment and training modes of civil helicopter rescuers and draws up a blueprint in line with China's national characters.

### Domestic and International Practice on the Recruitment and Training of Helicopter Rescuers

Helicopter rescuers are the critical part of flying rescue operation. They are not only responsible for the cockpit resource management, but also in charge of the lifting and transportation tasks. Therefore, it requires strong expertise and rigid training of essential rescue personnel to complete a helicopter rescue operation.

The United States has a world-class aviation industry with a powerful flying rescue team. Helicopter rescuers who are expected to perform their tasks over sea will be selected from the active military personnel. For helicopter rescuers whose duties involve solely missions on land, talent pools are larger and include the current and the former helicopter rescuers, as well as social volunteers that would later be trained after recruitment. The tasks for the U.S. flying rescue team are rather comprehensive tasks; apart from coordinated efforts with the coast guard on border control, combat readiness, anti-terrorism and relief needs under high sea conditions, the U.S. helicopter rescuers also need to provide social medical service when such needs arise. Therefore, when training, helicopter rescuers need to have extraordinary physical strength, rescue techniques and medical expertise, among other comprehensive abilities that are also required.

European countries, however, despite their different geographical and political needs, most of them tend to value specialized expertise on air medical first aid and medical personnel transfer. Judging from the operating mode, helicopter rescuers on the European continent can be divided into

two categories. First, the government-based rescue team such as that of the United Kingdom, France, and Italy. Civil police shoulder most of the responsibilities for emergency aids and they are funded mainly by local governments. The second method for organizing rescue team is through non-governmental organizations for mass medical relief. Typical countries that adopt this method include Germany, Switzerland and Austria. At present, to recruit and train helicopter rescuers, most European countries have established specialized institutions. For instance, the flying training school for police in Germany; MCA, RNLI, RLSS and similar organizations in Britain; comprehensive maritime security center in JOVELLANOS in Spain and so on.

Compared with Europe and the United States, China has a vast terrain with different geographical and climate conditions, and therefore helicopter rescue tasks in China are far more challenging and require more refined techniques of lifting, transportation and operating hoists. Helicopter rescuers are required to have extraordinary physical strength due to complex rescue environment and heavy rescue tasks. Over the recent years, China has been cooperating with the Hong Kong Government Flying Service in the training of helicopter rescuers. As China gains experience in rescuing, it gradually sets up its own threefold training system, which features basic training in the diving school, emergency evacuation training in the sea oil safety training company and initial training in the flying rescue team. When helicopter rescuers gain adequate experience, they will get upgrade training, eligibility training and night training until they are fully qualified to be the backbone of helicopter rescuers. The current training program for flying rescue team still has room for improvement in terms of its content, intensity and assessment criteria.

## Recruitment and Training Modes of Helicopter Rescuers in China

### Recruitment Mode

Through field research and by drawing on China's over 10 years of experience in developing helicopter rescuers' team, this part of the study focuses on the practitioners' basic qualities by taking a closer look at their qualification requirements, physical examination as well as physical fitness tests and evaluation.

Recruits should not only meet general qualification requirements such as literacy, age, height, weight, but should also have medical examination results that conform to qualified medical standards for aircrew and air traffic controllers. In addition, as helicopter search-and-rescue is a highly risky and demanding task that requires strong expertise and rich operational skills, helicopter rescuers should not only be equipped with advanced equipment, but should be in extraordinary physical state that should be measured from beyond one single sports performance. Four categories of tests are needed, namely, strength test (e.g. pull-ups/chin-ups, push-ups and sit-ups), physical balance and coordination test (e.g. rope skipping, balance beam), stamina test (e.g. 1500-meter run, 200-meter crawl swim) and explosiveness test (e.g. 100-meter dash). Specific parameters are shown in table 1:

Table 1 Minimum Physical Fitness Standards for the Civil Helicopter Rescuer Recruitment

Physical Fitness Test		Minimum Standard
Strength Test	Pull-ups/Chin-ups	7 [times]
	Push-ups	35 [times]
	Sit-ups	35 [times/min]
Physical Balance and Coordinate Test	Rope Skipping/Balance Beam	75 [times/min], 5 [m]
Stamina Test	1500-meter run	6 [min] 19 [s]
	200-meter crawl swim	5 [min] 54 [s]
Explosiveness Test	100-meterdash	15 [s] 5

For the person who has been recruited, the minimum physical fitness standards are different corresponding to the different age groups. There is one thing to be stated that, the physical balance

and coordinate test is not mandatory required for the recruited person. The specific standards are listed in the following table 2:

Table 2 Minimum Physical Fitness Standards for the Civil Helicopter Rescuer Training

Physical Fitness Test		Age (A)	Minimum Standard
Strength Test	Push-ups	$A \leq 28$	40 [times]
		$28 < A \leq 38$	30 [times]
		$38 < A \leq 48$	27 [times]
		$48 < A$	25 [times]
	Sit-ups	$A \leq 28$	45 [times/min]
		$28 < A \leq 38$	40 [times/min]
		$38 < A \leq 48$	38 [times/min]
		$48 < A$	36 [times/min]
Stamina Test	1500-meter run	$A \leq 28$	6 [min] 19 [s]
		$28 < A \leq 38$	6 [min] 54 [s]
		$38 < A \leq 48$	7 [min] 22 [s]
		$48 < A$	7 [min] 57 [s]
	200-meter crawl swim	$A \leq 28$	5 [min] 54 [s]
		$28 < A \leq 38$	6 [min] 54 [s]
		$38 < A \leq 48$	7 [min] 54 [s]
		$48 < A$	8 [min] 54 [s]
Explosiveness Test	100-meter dash	$A \leq 28$	15 [s] 5
		$28 < A \leq 38$	16 [s] 9
		$38 < A \leq 48$	17 [s] 8
		$48 < A$	18 [s] 3

Standardized recruitment mode, which is more objective, more scientific and more practical, can avoid the blindness and randomness in the process of recruitment. It is also beneficial to developing further training work more professionally and could enhance the professional skills of helicopter rescuer at the same time.

### Training Mode

In China, the helicopter rescuer is a designation given to the rescue specialists, who are engaged in search and rescue operations in the rescue helicopter in distress in the sea, on the land, or in the air with the rescue equipment and hoist equipment. To make it more concrete, the helicopter rescuer, who assists the pilot with communication, navigation and landing by providing the pilot with accurate clearance and operates the rescue hoist, is called winch man; while the one whose duties include going down the winch, scaling cliff faces, swimming and being responsible for personnel safety during the lifting and transport operations, is called swimmer. The highly specialized position is extremely challenging and requires an individual to be mentally and physically suited for very stressful and dangerous situations.

By regulation, air carriers, operations personnel, and essential aircrew involved in the helicopter rescue operation, are required to be extensively trained, in order to ensure a good working relationship. While the helicopter is hovering in the sky, the winch man uses the winch cable to load the equipped swimmer down from the helicopter to execute the rescue operation or to lift personnel

or material resources onboard the helicopter cabin. As the rescue environment is normally very complex and noisy, the rescue hand signal has to be used instead of language communication among the winch man, the equipped swimmer and the helicopter pilots.

Helicopter rescuer need to have the basic knowledge of aviation too, including radiotelephony communication, meteorological recognition, aviation chart recognition, search and rescue procedure and so on, and also the basic knowledge of helicopter equipment and cockpit resource management. Although the junior helicopter rescuers hardly need to use the hoist equipment during the rescue process, they still need to know the basic performance and method of use of helicopter rescue hoiston which the lifting and transport tasks are mainly relied.

A whole helicopter rescue operation is normally composed of five parts including accident finding, initial operation, make plan, take action and operation completed. Each part consists of a series of specific actions, such as accident assessment, making rescue plan, emergency handling of survivors or medical treatment. Take the medical treatment operation as an example, the helicopter rescuer need to be very familiar with the medical knowledge, in order to give out a quick and effective disposal in an emergency case.

In the following part, the training mode will be divided into four types according to the different work content and task requirements:

- Initial training: aimed at the newly recruited personnel. The initial training consists of theoretical knowledge and operational skills. The theoretical knowledge which is strictly required is mainly summed up and verified by the flying rescue experiences, while the operational part is based on the current training syllabus and further enhanced the professional operation skills.

- Upgrade training: aimed at the swimmer, who has already built enough helicopter flight time and had certain rescue experience. During the upgrade training, how to use the hoist equipment to complete the lifting and transport operation during the rescue mission would be the most important part. It will be divided into theoretical part and practical part, too. The swimmer, who has completed the upgrade training, should pass both the theoretical and operational assessments. Only the qualified personnel are allowed to engage in the hoist operation.

- Night training: aimed at either the swimmer or the winch man, who has already built enough helicopter flight time in the day time. During the night training, how to execute the rescue operation at night and how to use the night equipments would be the most important part. The night training is divided into two the theoretical part and practical part. The trainee, who has completed the upgrade training, should pass both the theoretical and operational assessments. Only the qualified personnel are allowed to engage in the night rescue operation.

- Eligibility Training: aimed at either the swimmer or the winch man. The content of eligibility training covers all training contents of initial training, upgrade training, and night training according to the corresponding positions.

For safety reason, it is strongly suggested that the helicopter rescuers should accept regular eligibility training and the annual inspection to avoid the consequences which could be caused by unpracticed skill.

## Conclusion

China is now in a new phase of implementing the strategies of "One Belt, One Road", "Improving National Strength through Marine Power", and "Improving National Strength through Marine Transport". For the transportation industry, the strategy of "Improving National Strength through Transportation" raises new requirements for China's salvage support system. New features shown by the waterborne transportation require us to extend the boundaries of closely watched and protected water area, face the new situations of marine safety and cope with the new challenges in improving our salvage capacity.

We should improve the overall performance of helicopter rescuers through standardized and specialized training, establish a specialized training mechanism for maritime search and rescue

personnel and improve their expertise. We need to improve the safety management of the risky marine salvage industry. These are measures correspondent with the national strategies of ruling the country by law and developing the marine power. They are also the cornerstones of developing a rescue team that are “firm in faith, strong in style, determined in task performance” and with “qualified personnel, sophisticated equipment and advanced technology”, and eventually plays a critical role when necessary. In addition, it is crucial for coordinating social rescue efforts, developing talent pools for China’s salvage industry and relevant volunteer organizations. It proves equally relevant in terms of setting up sophisticated standards and systems, safeguarding the developing of talents and establishing assessment and appraisal mechanisms for maritime search and rescue.

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