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參與「災害時船舶應用於醫療」 之日台國際研討會會議記述

Minute of Participation of Sino- Japanese International Seminar on "Vessels Employment in Medical Care During Disaster"



「災害時船舶應用於醫療」之日台國際研討會係於96年1月13日及14日實施，13日活動主要為參觀阪神淡路大地震紀念館及醫療法人平生會宮本洗腎中心。14日為研討會，由日本神戶大學海事科學部教授井上欣三主持，因採系統化規劃，由構想源起、構想概要、實施內容、台灣集集大地震救災說明與意見交換等，概述如下：

Sino-Japanese International Seminar on "Vessels Employment in Medical Care During Disaster" is held on th 13 and 14 of Januaruy, 2007. On the 13rd it is mainly to visit the Hanshin-Awaji Earthquake Memorical Hall and Miyamoto Medical Consortium dialysis center. On the 14th, we participated the seminar confernece presided by Prof. Inoue Kinzo from graduate school of maritime sciences, Kobe University. Since the seminar is conducted with systematic planning, the seminar contains the origin of conception, abstracted conception, content of implementation, elaboration and opinion exchange regarding disaster-salvaging of Chi Chi earthquake of Taiwan-it can be briefed as follows:



一、構想源起

1995年1月17日於日本發生阪神淡路大地震，造成陸上通信網路的中斷及陸上交通網路的癱瘓，使得人命救助、消防及醫療等緊急救援遲滯，但由海上利用船舶協助救援活動卻十分活躍，因此必須改變以陸上為救災中心的思考方式，研究從海上的觀點，對未來可能發生的災害，做前瞻考量及救災整備的危機管理。

日本阪神地區南北被山及海包夾，是東西向細長交通的瓶頸，若過度依賴陸上交通，則災害發生時的交通癱瘓將造成緊急救援活動的阻礙。在阪神間（大阪到神戶）如此長海岸線的沿岸地區，應可充分利用船舶具備自行完成工作能力、海上輸送能力及通信能力的特性，進行緊急救援工作。

二、構想概要

（一）災害時醫療支援船構想

災害時醫療支援船構想，係發生大規模災害時，運用船舶當作醫療支援船，在災區擔任救援及支援病患工作。

（二）災害時洗腎患者的運送

慢性病患，特別是洗腎患者，因災害導致陸上水、電等維繫生命資源中斷情況下，無法進行洗腎，生命陷入危險，而利用船舶運送人員的救援系統可將其運送到災區附近可

I. The origin of conception

The Hanshin-Awaji Earthquake, happened on 17th January, 1995, destroyed the land-base network of telecom and transportation. The disaster postponed the life rescue, fire-fighting, medical care and other emergency work, whereas the vessel assisting rescue missions on the sea becomes quite active. Therefore, the mentality to rescue from land has to be changed, and research from the perspective of sea and conduct crisis management with prospective consideration and disaster-salvaging preparation for possible disaster in the future.

The area of Osaka-Kobe, Japan is enwrapped by sea and mountain in the north and south, and is of the kind of bottleneck lying west to east in slim shape. It would render in complete transportation stalemate and obstruction of emergency rescue work if it relies too much on land transportation. The area between Osaka and Kobe being rather lengthy coastal lines should be well used the characteristics of vessels in independency of assignment, marine transportation and telecom capability to furnish emergency rescue work.

II. The abstracted conception

(I) The idea of medical rescue-salvaging boat in disaster

The idea of medical rescue-salvaging boat in disaster is that when large-scale of disaster occurs, vessels can be used as medical rescue assisting boat, and conduct rescue and salvaging work for patients in the disaster areas.

(II) Transportation of dialysis patient during disaster

Chronic patient, especially dialysis ones, can't conduct dialysis treatment and face a fatal conditions if life-support resources like water, electric etc. are interrupted by disaster. However, the vessel transportation can be used as rescue system to deliver patients to neighboring areas for dialysis treatment.

(III) The advantage of vessel utility



以洗腎的地方。

(三) 利用船舶的優點

船舶原本即有不受陸地災害影響的獨立維生系統（水、電運作等），且擁有獨立的通信設備，情報傳遞不受災害影響，故具備救援能力。災害發生時，亦可利用船上設施，提供災區臨時居住服務功能。

(四) 海陸聯繫支援系統

建立大規模災害發生時的災害情報網路，結合行政、支援機關、組織、團體，運用海上船舶支援陸上災害救援工作，由網路中樞統一調派船舶進行包括情報交換、物資調度、人員運送、提供臨時避難地等聯繫支援系統。

三、實施內容

(一) 災害發生時的基本應變對策

1. 確保運送患者至近郊各都市的海上路徑統合規劃災區方面之停泊據點與收容病患之支援城市停泊據點，建立各停泊據點間能有效運送的海上路徑。
2. 活用船舶功能進行患者搬運及醫療活動以患者搬運而言，平時不需要特別建造專門船舶準備待命，只需將平時航行於周邊之船舶納入協助體制即可。
3. 由指揮中心來進行任務統合設置能統合系統中各種機能的指揮中心是重要的，可以確保各種功能的一體性，做情報蒐集整理、判斷決定及指令下達等。

(二) 由海上支援網路實現緊急醫療活動

1. 海上支援網路架構的建立

日本透析醫學會呼籲結合神戶商船

Vessel is equipped with independent life-sustaining system "water and electricity operation" and telecom facilities which would not be affected by land disaster, therefore it has rescue capability. When disaster occurs, facilities on vessels can also be used as temporary shelter for refugees.

(IV) Land-sea communication support system

The government should integrate administration, support authorities, organizations and groups and use vessel to support land disaster rescue assignment in order to establish an information network for large scale disaster. This mechanism has the network center command the vessel operations including information exchange, resources allocation, personnel transportation, and provision of temporary shelter and other liaison support system.



III. The content of implementation

(I) The basic contingency strategy for disasters

1. Ensure the sea-route for sending patient to the neighboring cities

To integrate the plan for points of berth at the disaster areas and those for receive patients in supporting cities, and set the sea-route for effective transportation between these points.

2. Flexibly use the characteristics of vessel to conduct transportation and medical operation for patients

In terms of patient transportation it is not necessary to build specialized vessel for preparation during regular days, but only has vessels sailing in the neighboring waters into the support system.

3. Integrate assignments by command center

It is critical to establish the command center integrating each function within the system that conduct information collection, decision making and delivery of instruction.

(II). To realized emergency medical care from marine support network

1. The establishment of marine support network

The Japanese Society for Dialysis calls upon the integration commercial senior vocational high schools, including Kobe University of Mercantile Marine, to set up the initial marine support network.

2. The establishment of land-sea command center for marine support network

It will first base on the apprentice ship Shn Jiang Wan of Kobe University of Mercantile Marine, satellite telecom, and the



大學在內的2所商船大學及5所商船高專所有之7艘練習船，來建立初期的海上支援網路架構。

2. 海上支援網路之海陸聯合指揮中心據點的建立先以神戶商船大學的練習船「深江丸」、衛星通訊及神戶商船大學內之收訊基地為建立網路之基礎，期待發展出「陸上船舶運航管理系統」。

3. 陸上船舶運航管理系統

結合海上支援網路及海陸聯合指揮中心，利用「陸上船舶運航管理系統」，指揮中心可隨時監看海上支援網路掌控船舶動態，統合各船回報的資訊及醫療上的要求，適時且適當地由指揮中心發送指揮命令，調度相關船舶，達到有效率的支援。

四、台灣方面的應用構想

(一) 台灣的背景環境

台灣是地震多發地區，台灣地處環太平洋地震帶及歐亞、菲律賓板塊交界處，亦是地震多發國家，據統計過去90年來，平均每年有2200次地震，其中大多為無感地震，但亦有大地震，1999年集集大地震震級超過芮氏7級，奪走了二千多條人命，至今仍令人難忘。再者，台灣都會區大多臨近港口，台灣有部份人口稠密、陸上交通及通訊發達並臨近港口的都會區，如基隆市濱臨基隆港；台北都會區近台北港；高雄都會區濱臨高雄港，另小型城市如台南市亦臨近安平港等。由上述台灣的背景環境及條件推以，台灣是地震多發地區，且部份都會區臨近港口的條件，與日本有類似應用本構想的環境背景，是故，台灣的背景環境符合本應用模型。

(二) 台灣的應用構想

wave reception base within Kobe University of Mercantile Marine to develop "vessel navigation management system on land."

3. Vessel navigation management system on land

As an integration of marine support network and land-sea joint command center, with the use of "vessel navigation management system on land," the command center can monitor the status of support vessels on sea, collect the feedbacks from each vessel and medical care request, and suitably and appropriately deliver instruction and dispatch vessels to achieve efficiency support.

IV. Application Concept on the side of Taiwan

(I) Background environment of Taiwan

Taiwan located in the borderline of Pacific Quake Belt and the cross-line of Euro-Asia and the Philippine Plates is found a lot of earthquakes. According to the statistics in the previous 90 years, there is an average of 2200 earthquakes per year, and most of them are non-felling in contrast to a few large earthquakes. In 1999 the Chi Chi earthquake, which is measured to Richter Scale 7 and took more than 200 lives, is very well remembered until today. Furthermore, most of the cities are near harbors, and there are densely populated areas in metropolitan Taiwan with well-developed transportation and telecom on land and is also proximal to sea. For instances, Keelung City is near Keelung Harbor, Metropolitan Taipei area is near Taipei Harbor, Metropolitan Kaohsiung area is near Kaohsiung Harbor, and other small-scale city like Tainan City is near An-ping Harbor. As found from these background environment and conditions of Taiwan described, Taiwan is an area of lot earthquakes and most metropolitan areas are near harbor. In view of it, they are very much similar to the background conditions of application concept as found in Japan. Therefore, the background environment of Taiwan should fit this applicable mode.

(II) Application Concept of Taiwan

Initially, official ship, including vessels over 500 tons from Coast Guard Administration and fishing training ships from the Fishery Agency as experimental vessels for this mode, could be employed to conduct personnel, equipment transportation drill. Those vessels should conduct drills of transporting chronic patients, medical staff, and relevant equipment with the scenario of transportation for rescue between safe area and disaster area and relative emergency rescue. In the middle application period, vessels will be used as ward for



先期以公務船進行人員、設備運輸演習選擇本署500噸以上船艦及漁業署漁業訓練船為應用模型實驗船，演習搭載慢性病患、醫療人員及醫療設備，在假想之災區與安全區間做運送及相關緊急救護。中期則進行船上洗腎醫療應用，由於一般船舶艙內空間配置並未以洗腎醫療為設計，但藉由改變其電力及供水系統的配置，於災害發生時，迅速改裝成可供洗腎醫療應用是可行的，故建議以衛生署為主管機關，負責研議災害時船舶應用於洗腎醫療之相關規定。最後達到以貨櫃船擔任緊急醫療站的目標，平時將部份貨櫃改裝，加裝災害發生時可供醫療所需相關水、電系統，並預置於各港口。災害時則立即進駐相關醫療、水電設備，並藉由貨櫃船之吊桿，吊至貨櫃船上，接通船上水、電系統，成為緊急醫療站，進行緊急醫療，並可利用貨櫃船達到相關運送及通訊功能。

五、未來合作交流模式

台日雙方將輪流主辦本項研討會，今年下半年（約在10或11月間）輪由我方主辦，於台北召開，主辦機關暫定為台北醫學大學及國立海洋大學，屆時將請海巡署及農委會（漁業署）加入為協辦機關，並酌情提供相關經費、活動、人員等協助。

基於配合政府發展對日關係，增進台日雙方合作交流活動，該署將積極參與本研討活動，酌情提供相關支援與配合研討會之研究團隊，擴展辦理相關交流，增進台日關係。

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dialysis medical treatment. Though regular vessels are not designed with dialysis medical treatment, with the allocation of electricity and water supply system it is feasible to change it into dialysis medical treatment ward during disaster. It is, therefore, suggested that the Department of Health to be the authority in charge of formulating relevant regulations for dialysis medical treatment on vessel during disaster. At last, it can achieve the objective using container as the emergency medical station. During regular days, some of the containers are re-designed and installed with water and electricity system for disaster medical care, and then pre-locate them at each port. When disaster occurs, those containers can be installed with medical equipment, water and electricity system, and be craned onto container ships. Once connected with the supply system of the vessel, they can become emergency medical care station and conduct emergency medical treatment in addition to be used for transportation and telecom purpose.

V. Future cooperation and exchange model

Taiwan and Japan will held this seminar in turn, and in the second half of the this year " at about October or November" Taiwan will held the seminar in Taipei. The sponsoring institution is temporarily settled with the Taipei Medical Univeristy and National Taiwan Ocean Univesity. Then, the Council of Agriculture "Firsbery Administraiton" and Coast Guard Administraiton will take part as the assisting institution, and support relative funding, evnet and personnel.

Based on our government policy to develop the relationship, and enhance the cooperation and exchange activities between Taiwan and Japan, Coast Guard Administration will continuously take part in the seminar activities, and provide relevant support as needed to the research teams. As of such, it should expand our relevant exchange, and enhance Taiwan and Japan relationship.

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