

Study on the Weight Factors for Calculation of Local Oil Spill Response Capacities in Vietnamese Waters

베트남 해역에서 지역기름유출대응능력 계산을 위한 가중치에 관한 연구

Phan Van Hung* · Kwang-Soo Kim***

* Graduate School of Mokpo National Maritime University, Korea & Lecturer, Vietnam Maritime University, Vietnam

** Division of Navigation Science, Mokpo National Maritime University, Mokpo 58628, South Korea

Key Words : Oil spill response capacity, Vietnamese waters, Fuzzy AHP

1. Introduction

Vietnam is coastal and oil production country with more than 3,444 km of shoreline, thousands of islands, rivers and canals. The number of oil and petroleum products transported by vessels that entry and departure Vietnamese ports are increasing, resulting in risk of oil spill climbing. However, it is not clear whether local oil spill response capacity. We hypothesized that local oil spill response capacities play a vital role in controlling oil spill incident.

2. Method

In this study, the local states of 8 factors as capacity of oil store facilities, the number of vessel entry and departure, the volume of oil spills, the number of oil spill incidents, length of coastline and resources, area of surface water aquaculture, area of protected sea areas, coastal residents are analyzed, using fuzzy combined AHP and normalized data to calculate weight factors for local oil spill response capacities in Vietnam.

Table 1. Classification of area and local response

Area	Local province
NANOS	Quang Ninh - Hai Phong, Thai Binh - Nam Dinh - Ninh Binh, Thanh Hoa - Nghe An, Ha Tinh - Quang Binh
NACOS	Quang Tri - Thua Thien Hue, Da Nang - Quang Nam, Quang Ngai - Binh Dinh - Phu Yen, Khanh Hoa - Ninh Thuan
NASOS	Binh Thuan - Ba Ria Vung Tau, Ho Chi Minh, Tien Giang - Ben Tre - Tra Vinh - Soc Trang., Bac Lieu - Ca Mau - Kien Giang

3. Result and discuss

Table 2. The result of weight factors (W.F)

Upper evaluation (W.F)	Probability (0.685)				Sensitivity (0.315)			
	Lower evaluation (W.F)	Capability of oil store facilities (0.2130)	The number of vessel entry and departure (0.4620)	The volume of oil spill incidents (0.1620)	The number of oil spill incidents (0.1630)	Coastline length and resources (0.1840)	Area of surface water aquaculture (0.4060)	Area of protected sea areas (0.2150)
Weight factor	0.1065	0.231	0.081	0.0815	0.092	0.203	0.1075	0.0975

Table 3. Weight factors for local oil spill response capacity

Area	Local province	Final Weight factor
NANOS	Quang Ninh - Hai Phong	0.5409
	Thai Binh - Nam Dinh - Ninh Binh	0.1783
	Thanh Hoa - Nghe An	0.1893
	Ha Tinh - Quang Binh	0.0915
	Sum.	1
NACOS	Quang Tri - Thua Thien Hue	0.1463
	Da Nang - Quang Nam	0.2094
	Quang Ngai - Binh Dinh - Phu Yen	0.2969
	Khanh Hoa - Ninh Thuan	0.3474
	Sum.	1
NASOS	Binh Thuan - Ba Ria Vung Tau	0.3356
	Ho Chi Minh	0.2396
	Tien Giang - BT. TV. - Soc Trang	0.1511
	Bac Lieu - Ca Mau - Kien Giang	0.2738
	Sum.	1

4. Conclusion

In this study, both the marine environment and socio-economic issues and the causes of oil spill incidents were considered to calculate weight factors for local oil spill response capacities. The calculation shows the weight factors to be 0.5409 in Quang Ninh - Hai Phong, 0.3474 in Khanh Hoa - Ninh Thuan, 0.3356 in Binh Thuan - Ba Ria-Vung Tau. These weight factors are valuable data to estimate local oil spill response capacities of NANOS, NACOS, and NASOS.

* Representative Author: phanvanhung@vimaru.edu.vn

† Corresponding Author : kgs@mmu.ac.kr, 061-240-7165