Evaluation on the influence that offshore wind power generation facilities give to underwater creatures

- An Example in Setana Port -

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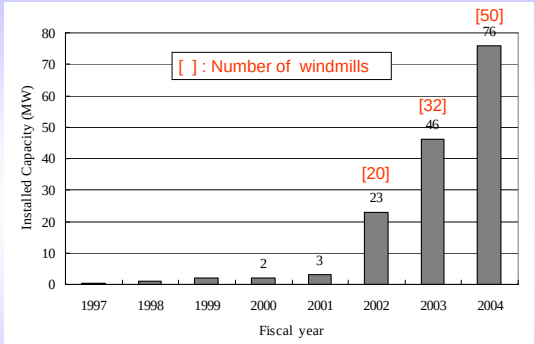


Fig.1: Development of Installed Capacity in Ports and Harbors Areas

Object of the surveys:

To understand

- **The characteristics of offshore wind farm's sound pressure level**
- **The impacts on aquatic Community arising from the operation of wind farm**

→

1. The sound pressure survey

2. The aquatic community survey

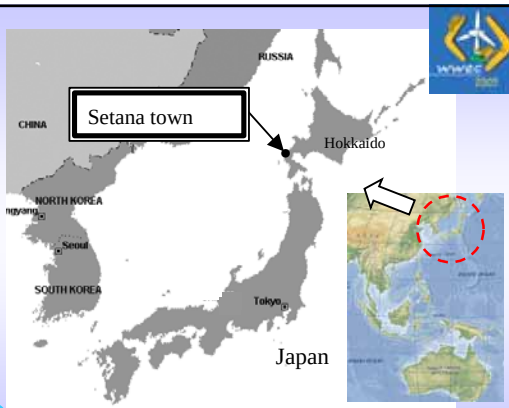


Fig.2: Location of Setana town

Photo.1: Windmills of Setana port

1.The sound pressure survey

August 16&17, 2004

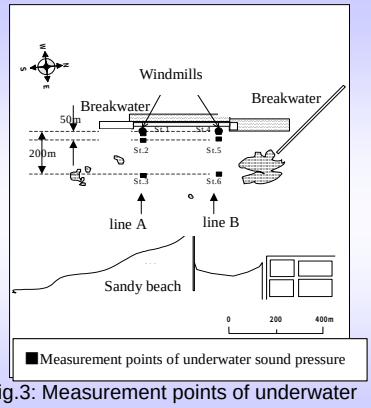


Fig.3: Measurement points of underwater sound pressure

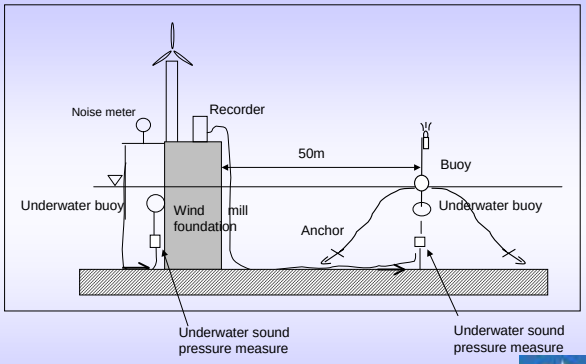


Image figure of the sound pressure survey (st1, st2, st4, and st6)

Measurement materials

Photo of underwater sound pressure survey

Table 1: Conditions under frequency analysis

Conditions	Line A (St.1～St.3)	Line B (St.4～St.6)	Purpose
Under strong wind (over 7m/s)	Case 1-1	Case 1-2	To compare the strong wind with the weak wind
During stopped operation	Case 2-1	Case 2-2	
Sea wind (about 4m/s)	Case 3-1	Case 3-2	To compare the difference of the direction of the wind
Land wind (about 4m/s)	Case 4-1	Case 4-2	

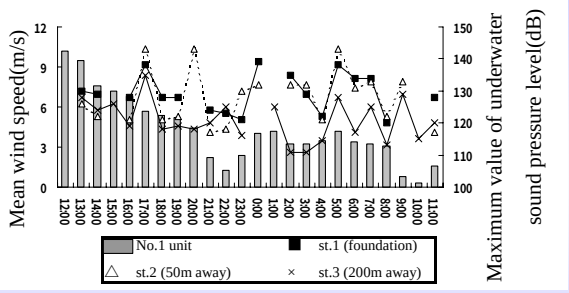


Fig.5(1): Correlation of wind speed vs. underwater sound pressure level (measurement line A)

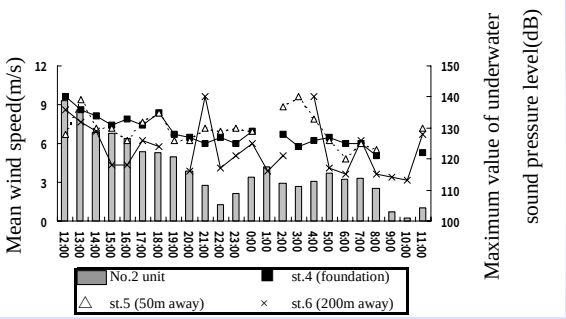


Fig.5(2): Correlation of wind speed vs. underwater sound pressure level (measurement line B)

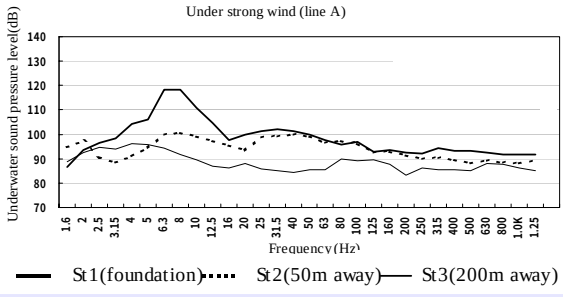


Fig.6(1): Frequency analysis: under strong wind (Case 1-1:Line A)

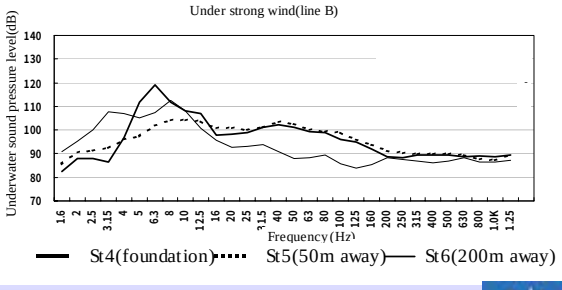


Fig.6(2): Frequency analysis: under strong wind (Case 1-2:Line B)

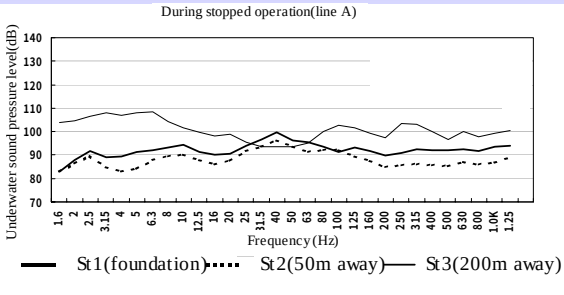


Fig.7(1): Frequency analysis: during stopped operation (Case 2-1:Line A)

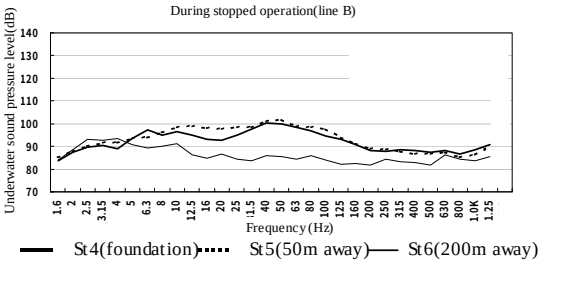


Fig.7(2): Frequency analysis: during stopped operation (Case 2-2:Line B)

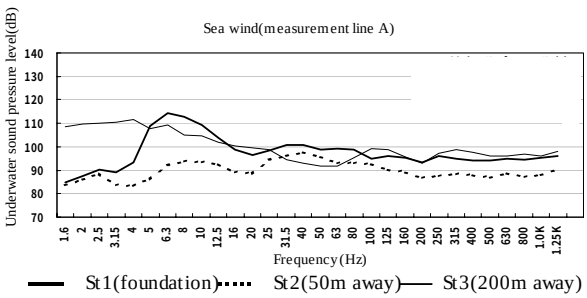


Fig.8(1): Frequency analysis: sea wind (Case 3-1:Line A)

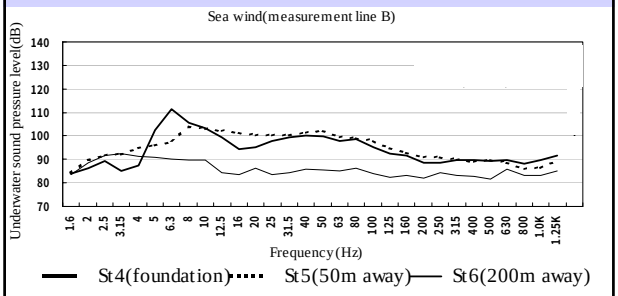


Fig.8(2): Frequency analysis: sea wind (Case 3-2:Line B)

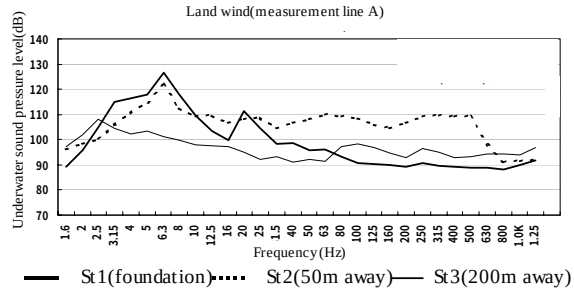


Fig.9(1): Frequency analysis: land wind (Case 4-1:Line A)

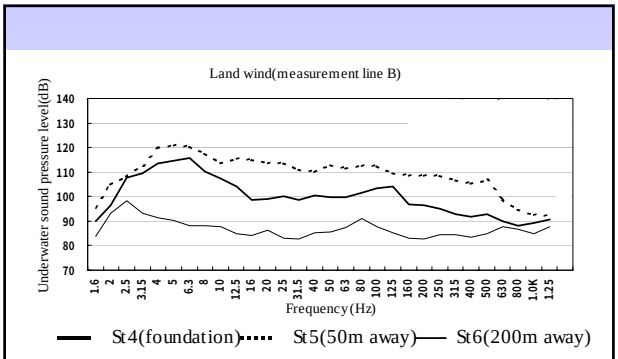


Fig.9(2): Frequency analysis: land wind (Case 4-2: line B)

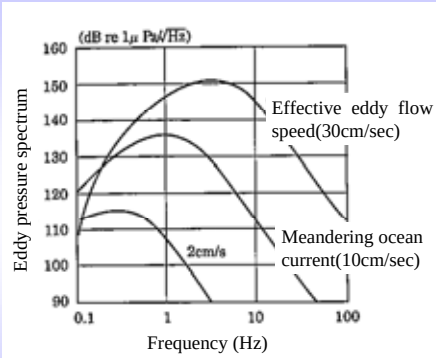


Fig.10: Eddy pressure spectrum

Conclusion

1. **The wind speed was 0－10 m/s and underwater sound pressure level was 109 －140dB.**

2. Underwater sound pressure level's frequency was 6 - 10Hz, in strong winds. This frequency is a strong resemblance to wave current disturbance.

→This is attributed to the fact that wave current disturbance was made by strong wind and breakwater.

2.The aquatic community survey

August 18&19, 2003

August 15, 2004

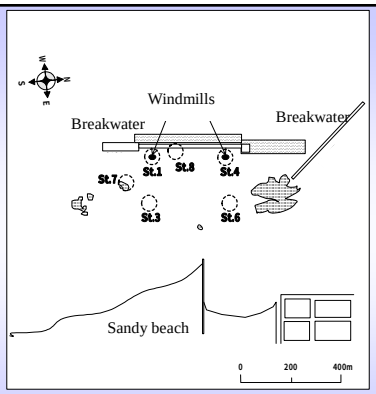


Fig.4: Observation points of aquatic community

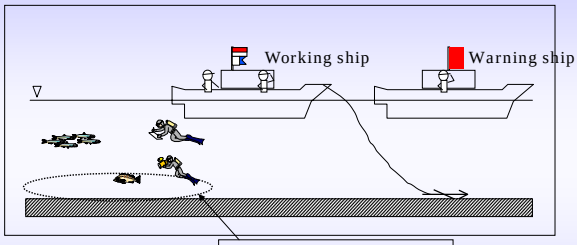


Image figure of the aquatic community survey: example1

Photo of aquatic community survey

Depth	7-8m
class	Sea bream

Aquatic community survey(st.4)

Depth	8-9m
class	Sea bream

Aquatic community survey(st.4)

Aquatic community survey: 2003/2004

Scientific name	st.1 Southern foundation		st.4 Northern foundation		st.7 Reef		st.8 Breakwater		st.3 Southern point	st.6 Northern point
	2003	2004	2003	2004	2003	2004	2003	2004	2004	2004
Hexagrammidae							1			
Hexagrammos otakii	5	8	2	4			1	4		
Oplegnathus fasciatus				8						
Sebastes thompsoni		40								
Ditrema temmincki		30	1	10		50	2	50		
Cottidae	2	3			1		2	4		
Pleuronectidae	1	1	2				1		1	3
Pleuronectes schrenki			1							
Stephanolepis cirrhifer		1		1						
Takifug niphobles									3	25
Sparidae								4		
Stichaeidae							1	1		
Callionymidae										1
Pterogobius zacalles					1	20				

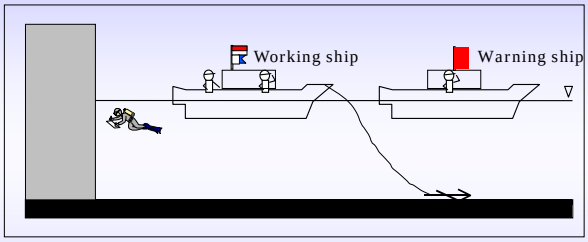
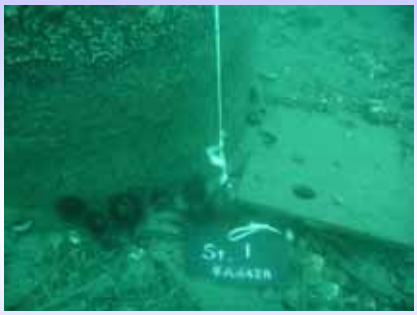
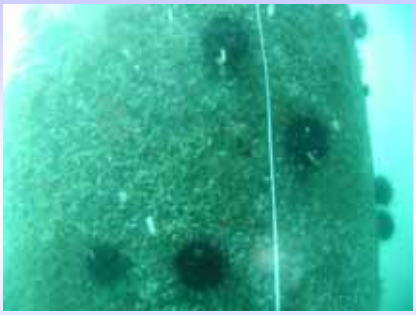


Image figure of the aquatic community survey: example2



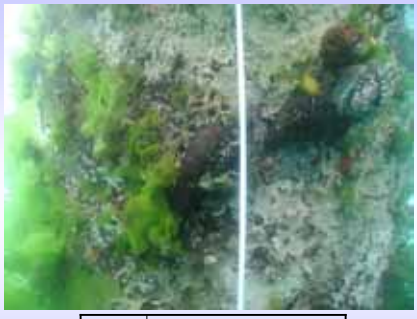
Depth	10 –11m
class	Sea-urchin

Aquatic community survey(st.1)



Depth	5 –6m
class	Sea-urchin

Aquatic community survey(st.4)



Depth	1 –2m
class	Sea hare

Aquatic community survey(st.4)

Conclusion

1. The species number of fish community did not show any difference between 2003 and 2004
2. Individual number increased in 2004.

But ‘‘‘‘

1. It is still too early to derive a conclusion from these research findings only, because aquatic habitats undergo a natural process of change dynamically.
2. Follow-up survey and monitoring of aquatic community is required on a continued basis.