Appendix 14.6

Benthos Survey Report

Kai Tak Development Engineering Study
Cum Design and Construction of Advance Works
Investigation, Design and Construction

Marine Ecological Survey - Benthos

Report

Submitted to

MAUNSELL ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD

By

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April 2007

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1 INTRODUCTION

The present survey is part of the Environmental Impact Assessment for the project "Kai Tak Development Engineering Study Cum Design and Construction of Advance Works Investigation, Design and Construction" and aims to:

- Provide baseline marine benthic condition in Kowloon Bay, Victoria Harbour and Kwun Tong Typhoon Shelter, and
- Identify presence (if any) of ecologically important species or habitats in the study area.

2 METHODOLOGY

2.1 Field Sampling

The survey was undertaken on 24 March 2007, at three sampling stations as proposed in the Sub-consultancy Notes. Two sampling stations A and B located at Kowloon Bay, Victoria Harbour (i.e. area nearby the abandoned Tai Tak airport runway) and one sampling station C located at Kwun Tong Typhoon Shelter (see Appendix I). The co-ordinates for the three stations were fixed by Global Positioning System (GPS) on board (Table 2.1).

At each station, five replicate sediment samples were collected using a 0.1 m^2 van Veen grab. Once one grab sample was collected, its volume of sediment was inspected for not less than 2L so that 0.1m^2 seabed substrate was sampled certainly. A photographic record of the colour of the sediment surface at each station was taken prior to processing of the samples.

The sediment sample was washed with gentle seawater through a 0.5 mm sieves. Large animals that were visible from the residues were hand-picked into a small plastic vial. All

remains were then washed and transferred into a plastic container and preserved with 5% borax-buffered formalin and stained with 1% Rose Bengal.

Table 2.1

GPS co-ordinates of sampling stations

Station	Latitude	Longitude
A	22° 18.210' N	114° 12.495' E
B	22° 17.943' N	114° 13.041' E
C	22° 18.616' N	114° 12.928' E

2.2 Laboratory Work

Sorting of all residues remaining on the 0.5 mm sieve was carried out in the laboratory. For quality assurance, the sediment residues of one third sorted samples were randomly re-checked. No fauna was missed during the sorting.

For collected specimens, taxonomic identification was done to lowest taxonomic resolution by a trained technician. Examination of the morphological features of the specimens was undertaken with the aid of both stereoscopic and compound microscopes. The taxonomic classification was according to the following references: Polychaetes: Day (1967), Gallardo (1967), Fauchald (1977), Wu et al. (1997), Sun (2004); Crustaceans: Dai and Yang (1991), Dong (1991); Molluscs: Qi (2004); Fishes: Li (2003). The number of individuals of every species was recorded by counting the anterior portions of the fauna only. Total biomass of every species was determined as preserved wet weight, after blotting the animals on filter paper for three minutes before weighing to the nearest 0.0001 g.

2.3 Data Analysis

All data were stored in MS EXCEL format and were input into the PRIMER program version 6 (Plymouth Marine Laboratory, UK) for subsequent statistical analyses. The data of five replicate grab samples were pooled for each station.

Cluster analysis (with SIMPROF permutation test) was employed to delineate spatial patterns (if any) of macrobenthic community at the three stations. The species representing each spatial group were determined by SIMPER analysis.

The Shannon-Weaver diversity (*H'*) and evenness (*J*) were calculated for each station by using formula below:

$$\text{Shannon-Weaver Diversity } (H') = -\sum_{1}^{s} (Ni/N) \ln (Ni/N) \text{ (Shannon and Weaver, 1963)}$$

$$\text{Species Evenness } (J) = H' / \ln s \text{ (Pielou, 1966)}$$

where s = total number of species; N = total number of individuals; Ni = number of individuals of the i^{th} species.

The status of community disturbance was assessed using the abundance/biomass comparison (ABC) method and *W* statistic was generated (Warwick, 1986; Warwick and Clarke, 1994).

ABC method is based on an ecological theory: when the benthic community is approaching equilibrium under stable and unpolluted environment ('undisturbed'), the biomass will become increasingly dominated by few large species and abundance of each species is less. In polluted environment ('disturbed'), the reverse occurs that the abundance was dominated by few small species and biomass of each species was small. The ABC method plotted relative proportions of biomass and abundance attributable to each species for every station. The species were ranked in order of importance on the x-axis (logarithmic scale) with percentage dominances of abundance and biomass on the y-axis (cumulative scale). Then *W* statistic was employed to measure the extent to which the biomass curve lies

above the abundance curve (Clarke, 1990). In case biomass curve lying above abundance curve, a positive *W* value was given that represented 'undisturbed' condition, and vice versa. The *W* ranged from -1 to +1 that presented a continuum from 'seriously disturbed' to 'purely undisturbed' conditions.

Further information about data analysis was included in Appendix II.

3 RESULTS

3.1 Sediment Characteristics

Through observation, two types of sediment were collected in present survey. At Kowloon Bay, Victoria Harbour (stations A and B), the sediment was a deep grey matrix of ~30% silt-clay fraction (<62μm in diameter) and ~70% course materials (i.e. sand, gravel, bivalve shells) (Fig. 3.1 and 3.2). At Kwun Tong Typhoon Shelter (station C), the sediment was mainly silt-clay fraction in black colour with pungent smell of hydrogen sulfide (H_2S) (Fig. 3.3).

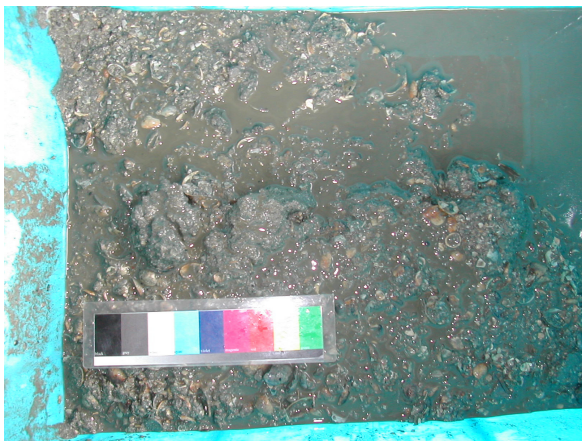

Figure 3.1. The sediment colour at sampling station A.

Figure 3.2. The sediment colour at sampling station B.

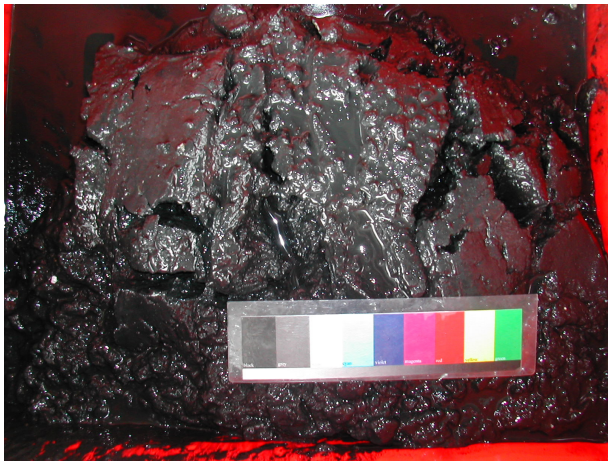

Figure 3.3. The sediment colour at sampling station C.

3.2 Macrobenthic Community

A total of 1,367 specimens were collected in present study while 50 of 54 taxa were identified to genus or species levels. The most diverse phylum was annelids (36 polychaete species + 1 oligochaete) followed by 12 species of arthropods, 3 species of mollusks, 1 species of nemertean and 1 species of fish. In number of individuals, 61%, 36%, 3% of specimens were polychaetes, arthopods and other phyla respectively. Table 3.1 showed the twenty most abundant species collected.

Table 3.1
The twenty most abundant species collected

No.	Group	Species	mean density (individuals m-2)	mean biomass (g m-2)	relative abundance (%)
1	C	Amphipoda	282	0.44	30.92
2	P	*Eunice indica*	229	1.96	25.15
3	P	*Mediomastus* sp.	75	0.11	8.26
4	P	*Cirriformia* sp.	53	0.18	5.85
5	P	*Glycinde gurjanovae*	39	0.04	4.31
6	P	*Glycera chirori*	35	0.80	3.87
7	C	*Alpheus japonicus*	23	1.28	2.56
8	P	*Ophiodromus angutifrons*	17	0.05	1.90
9	N	Nemertea	17	0.11	1.83
10	P	*Prionospio malmgreni*	13	0.06	1.46
11	P	*Tharyx* sp.	12	0.01	1.32
12	P	*Phyllodoce* sp.	11	0.03	1.24
13	P	*Harmothoe minuta*	9	0.18	1.02
14	P	*Ehlersileanira hwanghaiensis*	9	0.17	1.02
15	C	*Typhlocarcinops canaliculata*	6	1.12	0.66
16	P	*Branchiomma cingulata*	5	0.11	0.58
17	P	*Poecilochaetus hystricosus*	5	0.01	0.58
18	M	*Rhodopetala rosea*	4	0.06	0.44
19	M	*Lepidozona nipponica*	4	0.05	0.44
20	P	*Schistomeringos rudolphi*	4	0.00	0.44

P = Polychaeta, C = Crustacea, M = Mollusca, N = Nemertea

Cluster analysis delineated two station groups with significant difference (Fig. 3.4). Stations A and B belonged to one group (Kowloon Bay group) with 53.18% similarity while station C was another group alone (Kwun Tong Typhoon Shelter group). According to the

SIMPER analysis, the amphipods and polychaete *Eunice indica* were the representing species of Kowloon Bay group (Table 3.2). SIMPER analysis could not be conducted for station C since there was one set of data only. Only polychaetes *Cirriformia* sp., *Nectoneanthes oxypoda* and oligochaetes were found at station C in very low abundance.

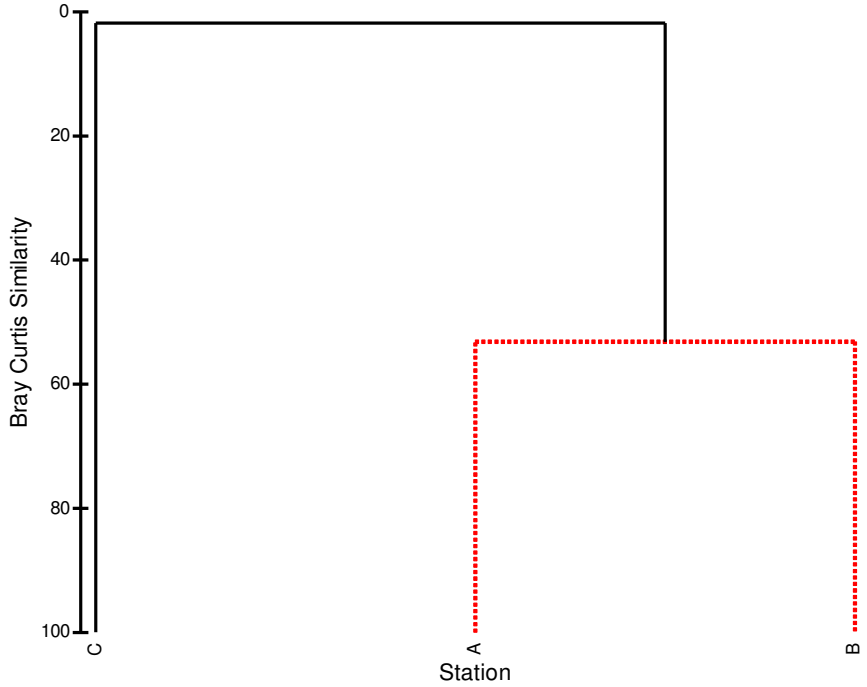

Figure 3.4. Dendrogram of station groups (solid lines represent significant delineation of groupings by SIMPROF test)

Table 3.2
The representing species for Kowloon Bay group (stations A and B) (Species contributing the first 50% cumulative faunal similarity within the group)

Group	Species	Mean abundance (no. individuals m^{-2})	Average similarity	% Contribution to faual similarity within group	Cumulative % contribution to faunal similarity within group
C	Amphipoda	423	19.68	43.65	43.65
P	*Eunice indica*	344	10.87	24.10	67.75

P = Polychaeta, C = Crustacea

Table 3.3 summarized the biological parameters for each station. Kowloon Bay group (stations A and B) was much higher in total number of species, total number of individuals and total biomass relative to Kwun Tong Typhoon Shelter group (station C). The Kowloon

Bay group (*H'*: 1.99-2.31; *J*: 0.55-0.64) has a higher *H'* and lower *J* than Kwun Tong Typhoon Shelter group (*H'*: 1.05; *J*: 0.96).

Table 3.3
The biological parameters of benthic community for each sampling station

Sampling stations	**A**	**B**	**C**
Total no. of species (spp 0.5m^{-2})	38	36	3
Total no. of individuals (individuals m^{-2})	1614	1110	10
Total wet weight (g m^{-2})	36.23	40.57	0.46
Shannon-Weaver diversity *H'*	2.31	1.99	1.05
Species Evenness *J*	0.64	0.55	0.96

Table 3.4 was the *W* statistic generated by ABC method. The sediment was considered 'disturbed' at station B with a small negative *W*. The sediment at station A was considered 'undisturbed' with a small positive *W*. Station C has a much higher positive *W* but it was not representative since the species number and abundance were very low.

Table 3.4
W statistic for each station

Station	***W***
A	0.04
B	-0.09
C	0.76

4 DISCUSSION

4.1 Sediment Characteristics

The sediment at Kowloon Bay, Victoria Harbour was the typical sediment along the channel of Victoria Harbour. Similar type of sediment was also found in an EIA survey done in 2002 whose two of the sampling stations were located in North Point water nearby Kowloon Bay (see EPD, 2004). Relative to other parts of Hong Kong waters, the sediment was coarser and organic-enriched due to strong tidal flushing and long-term eutrophication respectively (Shin et al. 2004).

The sediment at Kwun Tong Typhoon Shelter was believed in anoxic condition due to black colour and hydrogen sulfate smell. Although the water quality of Victoria Harbour has improved since the commencement of Harbour Area Treatment Scheme (HATS) Stage 1 in 2002, water mixing was minimized by the protected nature of typhoon shelter (Thompson and Shin, 1983). Hence the anoxic condition persisted in the sediment.

Neither important ecological function nor habitat was provided at all sampling stations.

4.2 Macrobenthic Community

All species found in present survey were widely distributed along the coast of China. More than 55% of abundance of collected fauna had been accounted by the first two abundant taxa amphipods and polychaete *Eunice indica*. In previous survey conducted by Thompson and Shin (1983), amphipod *Melita* sp. had been reported the representative species of benthic community (the fifth abundant taxon occupying ~5% of total abundance) in eastern Victoria Harbour where was polluted by sewage discharge. High abundance of amphipods was believed to correlate with high organic loading in sediment since majority of amphipod species relies on deposit-feeding of organic content (Aljetlawi *et al*., 2000). The polychaete

Eunice indica is a widely distributed species globally (e.g. Indian Ocean, Pacific Ocean, Japan, East Sea of China) (Yang and Sun, 1988) and locally (see CCPC, 2002). Compared with other sampling stations around Hong Kong waters in a survey done by CCPC (2002), the mean abundance of this polychaete species was much higher at Kowloon Bay. It was believed polychaete *Eunice indica* liked inhabiting organic-enriched sediments since the sediment at Victoria Harbour had higher organic loading than other parts of Hong Kong waters (Shin *et al*., 2004). Moreover the third abundant polychaete *Mediomastus* sp. was a characteristic opportunist (Grassle and Grassle, 1974; Fraser *et al.*, 2006) whose presence indicated a 'disturbed' environment. In general, the three most abundant species, which had accounted for more than 60% of all specimens, indicated a 'disturbed' status of the macrobenthic community.

4.2.1 Kowloon Bay group (Stations A and B)

The macrobenthic communities were the same pattern at stations A and B that coincided the homogenous sediment nature. The macrobenthic communities were represented by polychaete *Eunice indica* and amphipods. Both dominant species were recorded at one nearby sampling station of benthic survey done in 2001 but their abundance was much less (see CCPC, 2002). Also the amphipods were reported in moderate abundance in North Point water from previous EIA survey (EPD, 2004). Same as mentioned above, the dominance of amphipods and polychaete *Eunice indica* indicated a 'disturbed' community.

For comparison of *H'* and *J* of macrobenthic community with previous EIA studies in Victoria Harbour, the latest and suitable one was done by CCPC (2002) by considering same number of grab replicates. The mean *H'* and *J* at the stations A and B (mean *H'*: 2.15; mean *J*: 0.60) were higher than that at a station nearby North Point in previous study (*H'*: 1.23; *J*: 0.34) (see CCPC, 2002). However the mean *H'* and *J* at stations A and B were lower than the

stations locating at two ends of the harbour in previous study (*H'*: 3.29, *J*: 0.75 at Tung Lung Chau; *H'*: 2.66, *J*: 0.85 at Tsing Yi) (see CCPC, 2002).

The *W* statistic showed that the macrobenthic communities at stations A and B were intermediate between 'disturbed' and 'undisturbed' status. It indicated the macrobenthic communities at stations A and B were under mild stress.

Basing on present findings, it was believed that the benthic environment inside Victoria Harbour was 'disturbed' due to long-term severe discharge of raw sewage and land reclamation. The ecological significance was low at stations A and B.

4.2.2 Kwun Tong Typhoon Shelter group (Station C)

The macrobenthic community at station C was very low in species diversity, abundance and biomass relative to other stations. The benthic environment was almost defaunated at station C while the anoxic sediment was possibly the main cause. In a previous EIA study done by Ove Arup & Partners Hong Kong Ltd. (2001), the benthic environment inside typhoon shelter was also reported completely defaunated. Therefore station C had very low ecological value.

5 SUMMARY

A benthic survey was conducted to provide baseline marine benthic condition in Kowloon Bay, Victoria Harbour and Kwun Tong Typhoon Shelter for evaluating its benthic ecological significance.

According to the results, the benthic condition in Kowloon Bay (stations A and B) was low in ecological value since the benthic community indicated 'disturbed' condition. The benthic condition in Kwun Tong Typhoon Shelter (station C) had very low ecological value due to almost defaunation in anoxic sediment. The benthic environment was under stress at all stations due to long-term sewage discharge and land reclamation.

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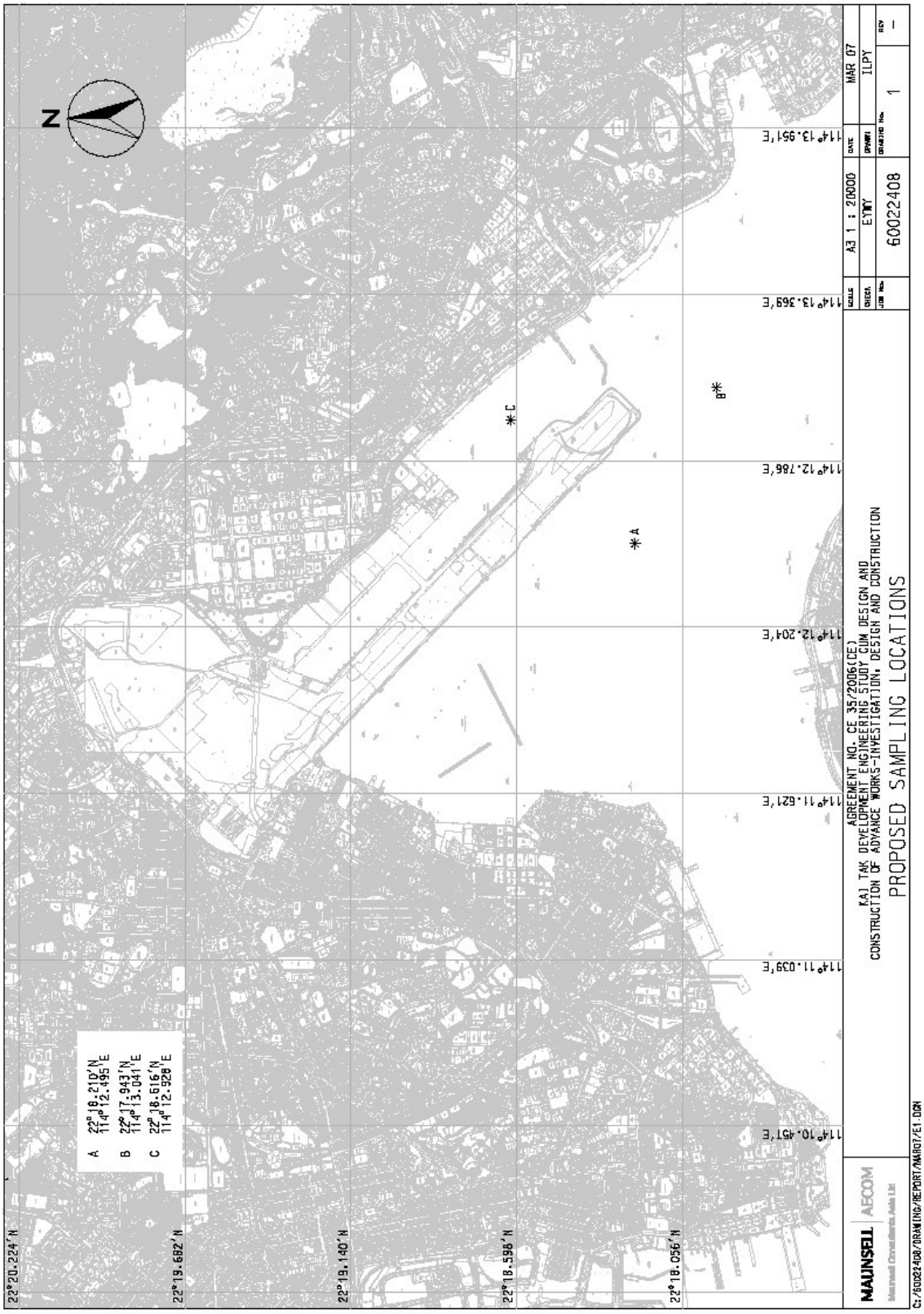
End of Report

Appendix I The Sampling Stations for Macrobenthic Infauna Study



Appendix II Further Information for Data Analysis

- Shannon-weaver diversity *H'*, measures the variety of species in a community taking into account the number and relative abundance of species.

- Species evenness, *J*, examines how similar species and abundance is within a community and varies between 0 (low evenness, i.e., few species dominate in terms of abundance) to 1 (high evenness, i.e., all species have equal abundance).

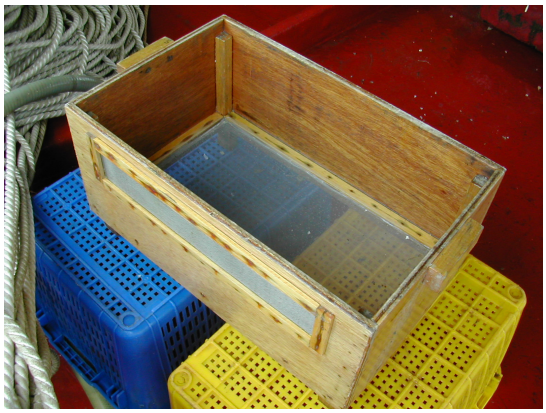
- Cluster analysis is a computer-sorting technique to join sampling stations that have similar faunal composition into a form of dendrogram (tree-like diagram). The significance of the grouping of stations formed in cluster analysis is examined by the Similarity Profile (SIMPROF) permutation tests.

- Similarity Percentage (SIMPER) analysis is to determine species representing the groupings of macrobenthic community (Clarke and Gorley, 2006).

Appendix III Photographic Records

0.1 m^2 van Veen grab

The collected sediment was transferred to a tray



Wooden box of 0.5mm sieve

The collected sediment was washed with gentle seawater

The sediment residues was preserved in large plastic containers

The preserved macrofauna in sediment residues was sorted out in laboratory

Appendix IV List of specimens for each sampling station

Station: A Sampling date: 24/03/2007														
No	Groups	Species	1		2		3		4		5		Total	
			Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.5m^2$)	Wet wt. ($g/0.5m^2$)
1	P	*Ampharete acutifrons*			1	0.00			2	0.01	2	0.00	5	0.02
2	P	*Schistocomus* sp.	2	0.00									2	0.00
3	P	*Mediomastus* sp.	16	0.04	20	0.06	10	0.02	15	0.03	16	0.04	77	0.19
4	P	*Cirriformia* sp.	19	0.05	18	0.07	5	0.03	16	0.07	21	0.18	79	0.40
5	P	*Schistomeringos rudolphi*	1	0.00	3	0.00					1	0.00	5	0.01
6	P	*Eunice indica*	106	1.06	60	0.57	10	0.15	33	0.41	61	0.94	270	3.13
7	P	*Lysidice ninetta*							1	0.00			1	0.00
8	P	*Glycera chirori*	12	0.34	8	0.10	3	0.09	12	0.35	10	0.31	45	1.18
9	P	*Glycera subaenea*	1	0.03	1	0.21							2	0.24
10	P	*Glycinde gurjanovae*	14	0.01	22	0.04	6	0.01	4	0.01	11	0.02	57	0.09
11	P	*Ophiodromus angutifrons*	3	0.00	3	0.00	3	0.00	3	0.00	2	0.01	14	0.02
12	P	*Lumbrinereis shiinoi*			2	0.00	1	0.00					3	0.01
13	P	*Aglaophamus dibranchis*							1	0.00			1	0.00
14	P	*Aglaophamus sinensis*	3	0.01	1	0.00	1	0.00					5	0.01
15	P	*Ophelina acuminata*							1	0.00			1	0.00
16	P	*Phyllodoce* sp.	4	0.01	2	0.00			4	0.03	4	0.02	14	0.05
17	P	*Poecilochaetus hystricosus*			2	0.01			3	0.01	2	0.01	7	0.03
18	P	*Harmothoe minuta*	3	0.02	1	0.00					1	0.02	5	0.04
19	P	*Branchiomma cingulata*			3	0.08	1	0.00	1	0.00			5	0.09

P = Polychaeta, C = Crustacea, M = Mollusca, N = Nemertea, F = Fish

- to be continued in next page -

Appendix IV List of specimens for each sampling station

Station: A Sampling date: 24/03/2007													
No	Groups	Species	1		2		3		4		5		Total	
			Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.5m^2$)	Wet wt. ($g/0.5m^2$)
20	P	*Scalibregma inflatum*									1	0.00	1	0.00
21	P	*Ehlersileanira hwanghaiensis*	1	0.03	3	0.08	1	0.01	1	0.01			6	0.12
22	P	*Prionospio malmgreni*	2	0.02	7	0.06	1	0.00	6	0.02	4	0.02	20	0.13
23	P	*Laonice cirrata*			2	0.00			1	0.00			3	0.00
24	P	*Amaeana* sp.					1	0.00	2	0.01	1	0.00	4	0.01
25	P	*Terebellidae* sp.							1	0.00			1	0.00
26	P	*Paralacydonia paradox*			1	0.00					1	0.00	2	0.00
27	N	Nemertea	5	0.02	3	0.03	1	0.00	4	0.01	6	0.04	19	0.10
28	C	*Charybdis variegata*	1	1.36									1	1.36
29	C	*Thalamita sima*					1	4.61	1	1.31			2	5.93
30	C	*Typhlocarcinops canaliculata*			2	0.58					1	0.16	3	0.74
31	C	*Xenophthalmus pinnotheroides*	2	0.58									2	0.58
32	C	*Alpheus japonicus*	2	0.08	3	0.23							5	0.31
33	C	*Clorida latreillei*					1	2.94					1	2.94
34	C	Amphipoda	36	0.09	26	0.03	57	0.04	12	0.01	3	0.01	134	0.18
35	C	Copepoda	1	0.00									1	0.00
36	M	*Calyptraea morbida*					1	0.04	1	0.00			2	0.04
37	M	*Rhodopetala rosea*					1	0.02					1	0.02
38	F	*Tridentiger obscurus*			1	0.12							1	0.12
Total			235	3.76	197	2.28	108	7.97	129	2.30	153	1.80	807	18.12

P = Polychaeta, C = Crustacea, M = Mollusca, N = Nemertea, F = Fish

Appendix IV List of specimens for each sampling station

Station: B Sampling date: 24/03/2007														
No	Groups	Species	1		2		3		4		5		Total	
			Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.5m^2$)	Wet wt. ($g/0.5m^2$)
1	P	*Notomastus* sp.			1	1.68							1	1.68
2	P	*Mediomastus* sp.	8	0.01	14	0.02	9	0.02	4	0.01	1	0.00	36	0.06
3	P	*Bhawania brevis*							1	0.00			1	0.00
4	P	*Tharyx* sp.	2	0.00	7	0.01	4	0.01	2	0.00	3	0.01	18	0.02
5	P	*Schistomeringos rudolphi*					1	0.00					1	0.00
6	P	*Eunice indica*	28	0.61	13	0.19	5	0.07	5	0.06	23	0.35	74	1.28
7	P	*Glycera chirori*	3	0.44	2	0.12			1	0.00	2	0.06	8	0.62
8	P	*Glycinde gurjanovae*			1	0.00					1	0.00	2	0.00
9	P	*Ophiodromus angutifrons*	1	0.08	4	0.00	1	0.00	1	0.00	5	0.01	12	0.09
10	P	*Lumbrinereis nagae*	1	0.42									1	0.42
11	P	*Nectoneanthes oxypoda*					1	0.03					1	0.03
12	P	*Ophelina acuminata*									1	0.01	1	0.01
13	P	*Naineris* sp.	1	0.00	3	0.00							4	0.00
14	P	*Phyllodoce* sp.	1	0.00					1	0.00	1	0.00	3	0.01
15	P	*Poecilochaetus hystricosus*	1	0.00									1	0.00
16	P	*Harmothoe minuta*			3	0.08	3	0.23			3	0.05	9	0.36
17	P	*Lepidasthenia* sp.			2	0.02							2	0.02
18	P	*Branchiomma cingulata*			3	0.15							3	0.15

P = Polychaeta, C = Crustacea, M = Mollusca, N = Nemertea, F = Fish

- to be continued in next page -

Appendix IV List of specimens for each sampling station

Station: B Sampling date: 24/03/2007														
No	Groups	Species	1		2		3		4		5		Total	
			Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.5m^2$)	Wet wt. ($g/0.5m^2$)
19	P	*Hydroides elegans*	1	0.00									1	0.00
20	P	*Ehlersileanira hwanghaiensis*			3	0.17	1	0.02	4	0.07			8	0.26
21	P	*Minuspio cirrifera*			1	0.00	1	0.00			1	0.00	3	0.00
22	P	*Loimia bandera*	1	0.00			1	0.00	1	0.01			3	0.01
23	N	Nemertea			3	0.07			1	0.01	2	0.07	6	0.15
24	C	*Charybdis variegata*					1	1.95					1	1.95
25	C	*Eucrate costata*					1	0.43	1	0.49	1	2.54	3	3.46
26	C	*Porcellanella triloba*			2	0.11	1	0.02	1	0.02			4	0.14
27	C	*Thalamita sima*	1	1.34			1	0.46					2	1.79
28	C	*Typhlocarcinops canaliculata*			5	1.50			1	0.28			6	1.78
29	C	*Alpheus japonicus*	7	0.56	4	0.60	2	0.37	5	0.31	12	0.73	30	2.57
30	C	*Solenocera crassicornis*	2	0.08					1	0.07	2	0.01	5	0.16
31	C	*Austinogebia edulis*			1	1.27							1	1.27
32	C	Amphipoda	43	0.09	73	0.22	88	0.30	31	0.09	54	0.10	289	0.80
33	M	*Calyptraea morbida*			2	0.03							2	0.03
34	M	*Rhodopetala rosea*			5	0.12							5	0.12
35	M	*Lepidozona nipponica*			5	0.11			1	0.01			6	0.12
36	F	*Tridentiger obscurus*	1	0.56			1	0.37					2	0.93
Total			103	4.18	159	6.44	125	4.28	66	1.43	117	3.95	555	20.28

P = Polychaeta, C = Crustacea, M = Mollusca, N = Nemertea, F = Fish

Appendix IV List of specimens for each sampling station

Station: C Sampling date: 24/03/2007														
No	Groups	Species	1		2		3		4		5		Total	
			Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.1m^2$)	Wet wt. ($g/0.1m^2$)	Ind. ($0.5m^2$)	Wet wt. ($g/0.5m^2$)
1	P	*Cirriformia* sp.							1	0.01			1	0.01
2	P	*Nectoneanthes oxypoda*			1	0.15			1	0.07			2	0.22
3	O	Oligochaeta			1	0.00			1	0.00			2	0.00
Total			0	0.00	2	0.15	0	0.00	3	0.08	0	0.00	5	0.23

P = Polychaeta, O = Oligochaeta