

一. 於水深 12m 處設置之測波站, 測得波高 3.0m 周期 8sec. 試求

1. 深海波波高及水深 8m 處之波高、波長 (15%)
2. 試求該處底床最大水平水分子流速 (10%)
3. 該處直徑  $D=30\text{cm}$  中之圓管, 水面附近所受之最大波力, 但  $C_D=1.17$   
 $C_M=2.0$  (15%)
4. 該波浪作用下, 粒徑  $d=0.2\text{mm}$  之底質完全移動水深 (10%)

二. 試求下列條件下, 6時及 12時之風浪為多少? (15%)

吹風時間 (hr)	風速 $U_{10}$ m/s	風域 $F$ km
0-6	18	400
6-12	20	400

(以下任選三題)

- 三. 在港灣及海岸工程上碎波為何重要? 影響碎波之因素為何? (15%)
- 四. 拋石堤, 直立堤與堰或堤各有何種利弊? (15%)
- 五. 挖泥船各型之優劣如何? 試予以比較之. (15%)
- 六. 微小振幅波與有限振幅波在波動性質上有何不同? (15%)

(注意: 三、四、五、六題任選三題)

$d/L$	$d/L$	$2d/L$	$\frac{\tanh 2d/L}{2d/L}$	$\frac{\sinh 2d/L}{2d/L}$	$\frac{\cosh 2d/L}{2d/L}$	$K$	$4nd/L$	$\frac{\sinh 4nd/L}{4nd/L}$	$\frac{\cosh 4nd/L}{4nd/L}$	$n$	$Ca/L_0$	.....	$M$
.0900	.1322	.8306	.6805	.9295	1.1653	.7134	1.661	2.538	2.723	.8273	.5632	.9422	10.65
.0910	.1331	.8363	.6818	.9372	1.1706	.7296	1.672	2.568	2.756	.8255	.5645	.9411	10.55
.09200	.1340	.8420	.6868	.9450	1.1759	.7268	1.684	2.599	2.785	.8238	.5658	.9401	10.46
.09300	.1349	.8474	.6897	.9525	1.1810	.7241	1.695	2.630	2.814	.8221	.5670	.9391	10.37
.09400	.1357	.8528	.6923	.9600	1.1862	.7214	1.706	2.662	2.843	.8204	.5682	.9381	10.29
.09500	.1366	.8583	.6953	.9677	1.1917	.7186	1.717	2.693	2.873	.8187	.5693	.9371	10.21
.09600	.1375	.8639	.6982	.9755	1.1970	.7158	1.728	2.726	2.903	.8170	.5704	.9362	10.12
.09700	.1384	.8694	.7011	.9832	1.2023	.7131	1.739	2.759	2.933	.8153	.5716	.9353	10.04
.09800	.1392	.8749	.7039	.9908	1.2077	.7104	1.750	2.790	2.963	.8136	.5727	.9344	9.962
.09900	.1401	.8803	.7066	.9985	1.2131	.7076	1.761	2.822	2.994	.8120	.5737	.9335	9.884
.1000	.1410	.8858	.7093	1.006	1.2187	.7049	1.772	2.855	3.025	.8103	.5747	.9327	9.808
.1010	.1419	.8913	.7120	1.014	1.2242	.7022	1.783	2.888	3.057	.8086	.5757	.9319	9.734
.1020	.1427	.8967	.7147	1.022	1.2297	.6994	1.793	2.922	3.088	.8069	.5766	.9311	9.661
.1030	.1436	.9023	.7173	1.030	1.2354	.6967	1.805	2.956	3.121	.8052	.5776	.9304	9.590
.1040	.1445	.9076	.7200	1.037	1.2410	.6940	1.815	2.990	3.153	.8036	.5785	.9297	9.519
.1050	.1453	.9130	.7226	1.045	1.2465	.6913	1.826	3.024	3.185	.8019	.5794	.9290	9.451
.1060	.1462	.9184	.7252	1.053	1.2523	.6886	1.837	3.059	3.218	.8003	.5803	.9282	9.384
.1070	.1470	.9239	.7277	1.061	1.2580	.6859	1.848	3.094	3.251	.7986	.5812	.9276	9.318
.1080	.1479	.9293	.7303	1.069	1.2638	.6833	1.858	3.128	3.284	.7970	.5820	.9269	9.254
.1090	.1488	.9343	.7327	1.076	1.2692	.6806	1.869	3.164	3.319	.7954	.5828	.9263	9.191
.1100	.1496	.9400	.7352	1.083	1.2752	.6779	1.880	3.201	3.353	.7937	.5836	.9257	9.129
.1110	.1505	.9456	.7377	1.093	1.2814	.6752	1.891	3.237	3.388	.7920	.5843	.9251	9.068
.1120	.1513	.9508	.7402	1.101	1.2871	.6725	1.902	3.274	3.423	.7904	.5850	.9245	9.009
.1130	.1522	.9563	.7426	1.109	1.2932	.6697	1.913	3.312	3.459	.7888	.5857	.9239	8.950
.1140	.1530	.9616	.7450	1.117	1.2990	.6671	1.923	3.348	3.494	.7872	.5864	.9234	8.891
.1150	.1539	.9670	.7474	1.125	1.3051	.6645	1.934	3.383	3.530	.7856	.5871	.9228	8.835
.1160	.1547	.9720	.7497	1.133	1.3108	.6619	1.944	3.423	3.566	.7840	.5878	.9223	8.780
.1170	.1556	.9775	.7520	1.141	1.3171	.6592	1.955	3.462	3.603	.7824	.5884	.9218	8.726
.1180	.1564	.9827	.7543	1.149	1.3230	.6566	1.966	3.501	3.641	.7808	.5890	.9214	8.673
.1190	.1573	.9882	.7566	1.157	1.3293	.6539	1.977	3.540	3.678	.7792	.5896	.9209	8.621
.1200	.1581	.9936	.7589	1.165	1.3356	.6512	1.987	3.579	3.716	.7776	.5902	.9204	8.569
.1210	.1590	.9989	.7612	1.174	1.3418	.6486	1.998	3.620	3.755	.7760	.5907	.9200	8.518
.1220	.1598	1.004	.7634	1.182	1.3479	.6460	2.008	3.659	3.793	.7745	.5913	.9196	8.468
.1230	.1607	1.010	.7656	1.190	1.3546	.6433	2.019	3.699	3.832	.7729	.5918	.9192	8.419
.1240	.1615	1.015	.7678	1.198	1.3605	.6407	2.030	3.740	3.871	.7713	.5922	.9189	8.371
.1250	.1624	1.020	.7700	1.207	1.3674	.6381	2.041	3.782	3.912	.7698	.5926	.9186	8.324
.1260	.1632	1.025	.7721	1.215	1.3734	.6356	2.051	3.824	3.952	.7682	.5931	.9182	8.278
.1270	.1640	1.030	.7742	1.223	1.3795	.6331	2.061	3.865	3.992	.7667	.5936	.9178	8.233
.1280	.1649	1.036	.7763	1.231	1.3862	.6305	2.072	3.907	4.033	.7652	.5940	.9175	8.189
.1290	.1657	1.041	.7783	1.240	1.3927	.6279	2.082	3.950	4.074	.7637	.5944	.9172	8.146

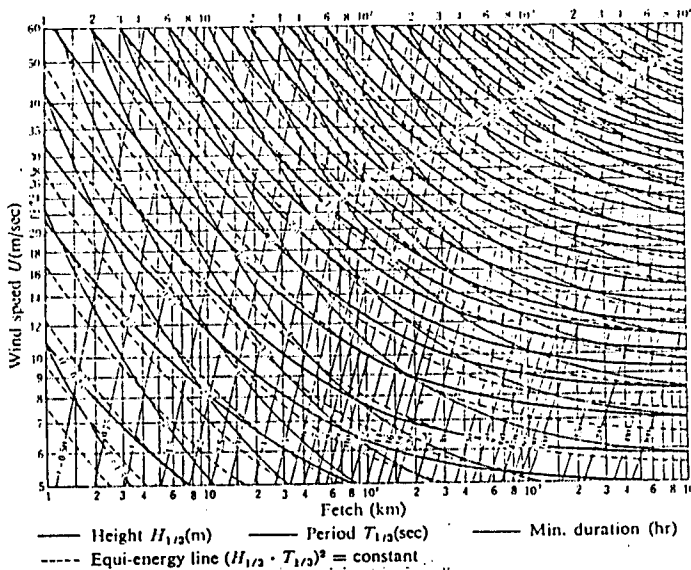


Fig. 2.7.7 Deep water wave forecasting curves based on the SMB method (after Hydraulic Formulae, JSCE, 1971).

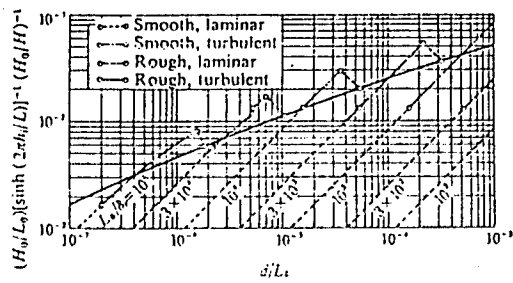


Fig. 5.4.9 Diagram to determine the critical water depth for general movement (after Horikawa and Watanabe, 1967).

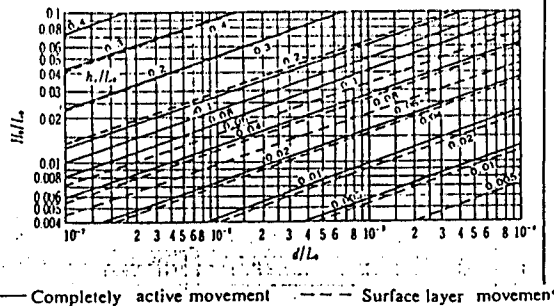


Fig. 5.4.10 Diagram to determine the critical water depths for complete movement and surface layer movement (after Sato, 1966).

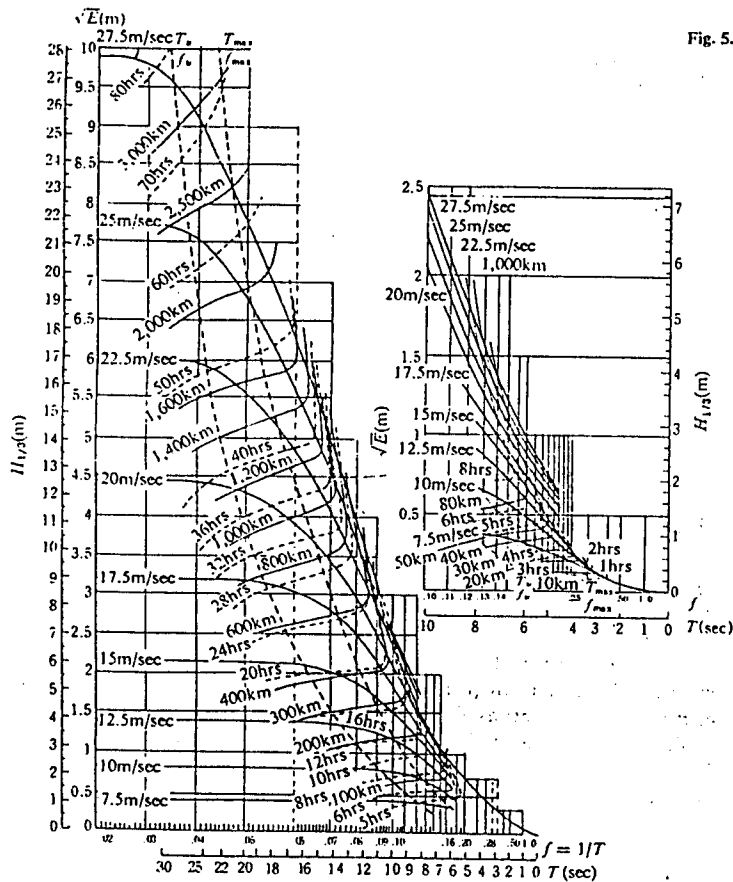


Fig. 2.7.11 C.C.S. curves for PNJ method (after Hydraulic Formulae, JSCE, 1963).

$$\phi = \frac{ag \cosh k(h+y)}{\sigma \cosh kh} \sin(kx - \sigma t) \quad u = \frac{\partial \phi}{\partial x} = a\sigma \frac{\cosh k(h+y)}{\sinh kh} \cos(kx - \sigma t) = \sigma \frac{\cosh k(h+y)}{\sinh kh} \eta \quad (2.3.22)$$

$$= \frac{a\sigma \cosh k(h+y)}{k \sinh kh} \sin(kx - \sigma t)$$

$$v = \frac{\partial \phi}{\partial y} = a\sigma \frac{\sinh k(h+y)}{\sinh kh} \sin(kx - \sigma t) \quad (2.3.23)$$