INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION

IMCO

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Technical Committee

PROGRESS REPORT OF THE WORKING GROUP ON GROSS AND NET TONNAGE (Part II)

8. On 9 and 10 June 1969 the Working Group under the Chairmanship of Mr. P. Eriksson (Sweden) attended by its members as listed in paragraph 1 of Part 1 of the progress report (TM/CONF/C.2/WP.19) continued with its work after having received further results of the computer calculations.

Formula $NT = a_1 \nabla$

9. In addition to the computer exercises reported in paragraph 7(b) the following studies have been carried out:

(a) Out of the IMCO fleet all those ships were selected for which no deduction for water ballast spaces in the tonnage certificate were shown. This selection comprised mainly small ships. The results of the exercises are shown at Annex III column 1.

(b) For the logarithmic type of the formula in addition to the exercises reported in paragraph 7(b) the following coefficients were tested:

$$A = 0.1 + 0.05 \log_{10} \nabla \quad \text{and}$$

$$A = 0.125 + 0.04 \log_{10} \nabla$$

the results being shown at Annex III columns 2 and 3.

Formula NT = $a_1"\nabla + a_2"P - a_3"WB$

10. The above formula was investigated by Group III.

(a) However as the data of the IMCO fleet did not include the total volume of ballast water spaces but were only available for a restricted number of mainly British and Japanese ships, a computer exercise for this formula was not possible. The formula without the second term in the form NT = 0.29∇ - 0.21WB and in the form NT = A(∇ - WB) were investigated.

The computer exercise was carried out using the water ballast deduction of the IMCO and UK data corrected to total amount of water ballast using the ratio between total and deducted amount calculated for certain Japanese and British ships. In the exercise passenger ships were excluded.

The results of the computer exercises for the above two formulae are shown at Annex IV.

(b) As, however, for instance for ore carriers the amount of water ballast can be of the order of 60 - 80 per cent of the displacement, it was agreed that a lower limit of net tonnage was needed. For this limit NT > 0.3 GT was proposed.

(c) Regarding the passenger term $a_2"P$ of the formula above the expression $P = N_b + \frac{N_u}{10}$ was used resulting from studies by Denmark and Italy and for the coefficient $a_2" = 1 + \frac{\nabla}{10,000}$ was suggested tentatively.

The results of the computer study using the formula $NT = 0.29\nabla + (1 + \frac{\nabla}{10,000})(N_b + \frac{N_u}{10})$ for the passenger ships of the IMCO fleet are shown at Annex V.

11. Having accomplished the computer studies mentioned under paragraph 10(a) the Working Group decided to repeat the calculation for two groups of ships below and above 2,000 GT in order to

cover more comprehensively the size of ships. The results of this additional study for the second formula are given at Annex VI.

General remarks

12. At the request of the Danish delegation its paper TM/CONF/C.2/WP.10 and TM/CONF/C.2/WP.10/Add.1 were considered. However, in view of the decision by the Technical Committee that the gross tonnage should not be function of displacement, draught or freeboard, only a brief discussion took place and no decision was taken.

ANNEX III

Formula	$NT = A\nabla$	$NT = \nabla(A+B \log_{10}\nabla)$	
Coefficients	A = 0.2461	A = 0.1 B = 0.05	A = 0.125 B = 0.047
Total No. of Ships	47	591	591
No. of ships retained	46	561	560
Percentage of mean deviation	8,057	-7.917	-12.338
SD_o	28.699	24.553	27.338
SD_m	27.519	23.5239	24.195
Fleet per cent change	24.028	-4.422	-8.514

ANNEX IV

Formula	$NT = A\nabla - B(WB)$	$NT = A(\nabla - WB)$
Coefficient	A = 0.29 B = 0.21	A = 0.2953
Total No. of ships	516	516
No. of ships retained	486	482
Percentage of mean deviation	1.651	3.429
SD_o	16.701	18.536
SD_m	16.619	18.216
Fleet change	9.882	12.099

ANNEX V

$$NT = .29\nabla + (1 + \frac{\nabla}{10{,}000})(N_b + \frac{N_u}{10})$$

Results:

Percentage of Mean Dev.	-15.7320
SD_o	29.296
SD_M	24.6644
Fleet per cent change	-17.92

Name	R.N.T.	F.N.T.	Percentage Deviation
LP-1	2616	1263.77	-51.69
LP-2	1318	1079.19	-18.11
NP-34	11489	8579.04	-25.32
-35	2600	1899.97	-26.92
-36	2562	1899.97	-25.84
-37	3488	2489.03	-28.64
-38	3522	2390.69	-32.12
SP-34	12883	11047.79	-14.24
KP-43	13900	9089.05	-34.61
-44	21880	14815.36	-32.28
-45	11625	9645.00	-17.03
UP-1	2061	2114.11	2.57
-2	1322	1164.93	-11.88
GP-1	15694	13277.20	-15.39
-2	12167	10330.00	-15.09
-3	17227	15587.50	-9.510
-4	24572	21340.30	-13.15
-5	6633	4416.23	-33.42
-6	15962	14161.56	-10.15

Name	R.N.T.	F.N.T.	Percentage Deviation
QP-1	519	451.24	-13.05
-2	1379	811.51	-41.15
-3	1608	947.00	-41.10
YP-27	13536	15312.88	13.12
-28	11229	12756.48	13.60
FP-1	36063	29829.28	-17.28
-2	7739	4982.34	-35.62
KM-46	2868	2505.58	-12.63
-47	3793	2336.63	-38.39
-48	4707	4260.63	-9.48
GM-1	3624	2741.26	-24.35
-2	2758	2218.60	-19.55
-3	6406	5938.07	-7.30
-4	2990	2210.86	-26.05
-5	2311	1699.94	-26.44
-6	2495	1752.32	-29.76
-7	7240	5779.00	-20.17
QM-1	814	558.66	-31.36
-2	1167	914.13	-21.66
-3	320	270.25	-15.54
-4	7272	6399.74	-11.99
OM-1	5418	4797.91	-11.44
-2	773	695.58	-10.01
SM-36	20928	15985.10	-23.61
YM-29	7496	6895.00	-8.01
-30	4327	4203.12	-2.86
-31	4916	4332.40	-11.87
FM-1	7263	5810.20	-20.00
-2	7194	5918.24	-17.73
-3	7022	5193.79	-26.03

Name	R.N.T.	F.N.T.	Percentage Deviation
AZ-1	2355	2031.85	-13.72
-2	1480	1283.07	-13.30
LZ-1	1195	1071.42	-10.34
-2	467	539.47	15.51
NZ-41	1096	1004.66	-8.33
-42	933	851.17	-8.77
-43	352	454.27	29.05
-44	744	616.84	-17.09
SZ-37	1335	1328.12	-0.51
PZ-1	2914	1798.40	-38.28
KZ-50	2825	1052.80	-62.73
GZ-1	687	608.53	-11.42
-2	1013	1748.89	72.64
-3	2006	1773.85	-11.57
-4	2572	1608.32	-37.46
-5	2691	2421.72	-10.00
W-1	528	665.14	25.97
-2	2880	1845.55	-35.91
-3	4298	2033.71	-52.68
OZ-1	1759	2216.00	25.98
-2	1532	1263.23	-17.54
SX-35	3276	2340.30	-28.56
NX-39	2100	1642.29	-21.79
-40	2791	1642.29	-41.15
LX-1	692	1222.00	76.58
-2	797	1078.42	35.30
KX-49	2730	1741.60	-36.20
GX-1	288	254.14	-11.75
UF-1	3521	346.48	-90.15
-2	2868	2505.58	-12.63

ANNEX VI

Limitation	≤2000 GRT	>2000 GRT
Formula	NT = A(∇ - WB)	
Coefficient	A = 0.2331	A = 0.3093
Total No. of Ships	111	405
No. of ships retained	107	382
Percentage of mean deviation	5,514	2.545
SD_o	23.593	15.974
SD_m	22.933	15.770
Fleet per cent change	9.423	8.378