



IMCO

INTERNATIONAL CONFERENCE ON TONNAGE MEASUREMENT, 1969

Technical Committee

THE FORMULA FOR GROSS TONNAGE

Submitted by Denmark

The IMCO Sub-Committee on Tonnage Measurement in 1965 collected very complete data on 483 ships, of which 174 were dry cargo ships, 91 tankers and the remaining were raised quarterdeckers, bulk carriers, ore carriers, refrigerator ships, passenger ships, mixed cargo and passenger ships, cross-channel ships and ferries. The data was supplied by 14 countries amongst which all those having a total tonnage of more than 10 million GT, and the ships were judged by the Committee as being representative of the total world tonnage.

The data has now been used for testing the proposed formula:

$$GT = a.V$$

"a" being a coefficient, and "V" the total volume expressed in units of 120 cubic feet in accordance with Proposal C.

The appended diagrams, marked S.22, S.23 and S.24 illustrate the outcome of this analysis. The ordinate axis represents the ratio: New Tonnage/Existing GT, and the abscissa is the logarithm of the displacement. The diagram S.22 deals with all 10 ship types, S.23 with the 6 cargo ship types and S.24 with the 4 passenger ship types. S.22 and S.23 show

TM/CONF/C.2/WP.10

much the same picture. Except for the plottings for the small ships the diagrams clearly indicate a decrease in the ratio with increased ship size, or, in other words, the unit chosen as 120 cubic feet should decrease more or less linearly with the logarithm of displacement or total volume. This is in complete accord with the findings of the delegation of the United States in TM/CONF/C.2/3, and with the formula suggested by the Netherlands in TM/CONF/3, where $a = .135 + .035 \log_{10} V$.

It will also be observed that the diagrams indicate an appreciable scatter. A great part of this scatter is believed to stem from the open shelterdeckers, which having low gross tonnages under the present regulations automatically will get high ratios of New GT/Existing GT.

The Conference has decided that the present practice of "frequent" changes between "open" and "closed" conditions should be discontinued, that infrequent changes were permissible, but should not be reflected in the gross tonnage figures.

Nothing has, however, been decided as to the ships operating permanently - or for long periods - with a freeboard in excess of the minimum freeboard from the uppermost deck.

Many shipowners in all countries are interested in the transport of light cargoes and have, for this purpose, used ships with increased freeboards, including open shelterdeckers. These ships are obviously safer than ships with low freeboards, and shipowners should not be discouraged from building these ships.

It is therefore suggested that the coefficient "a" should be further proportional to the ratio of maximum designed draught to maximum draught obtainable for full scantling vessels under the regulations of the Load Line Convention, 1966. Such ships could thus, as previously, be constructed with reduced scantlings due to the lesser draught and continue to be competitive.

If such a correction is not introduced, it will be economically less attractive to build ships in the future, and the single-decker with lower freeboard and therefore lower total volume will replace it. It would be deplored if the new tonnage regulations had this adverse influence on ship design and on the safety of ships.

It should be emphasized that the proposal does not only relate to small ships but also to the giant container ships now being built or designed. If this correction is not applied, these ships might be designed with minimum depth and a towering deck cargo, which might endanger these ships in heavy seas.

If, on the other hand, such a correction is introduced, it will further be possible to bring new gross tonnage figures into better accordance with those of present ships - in the interest of all parties.

The Danish delegation therefore suggests that the Technical Committee seriously discusses this proposal.

1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5

100

1000

10000

100000

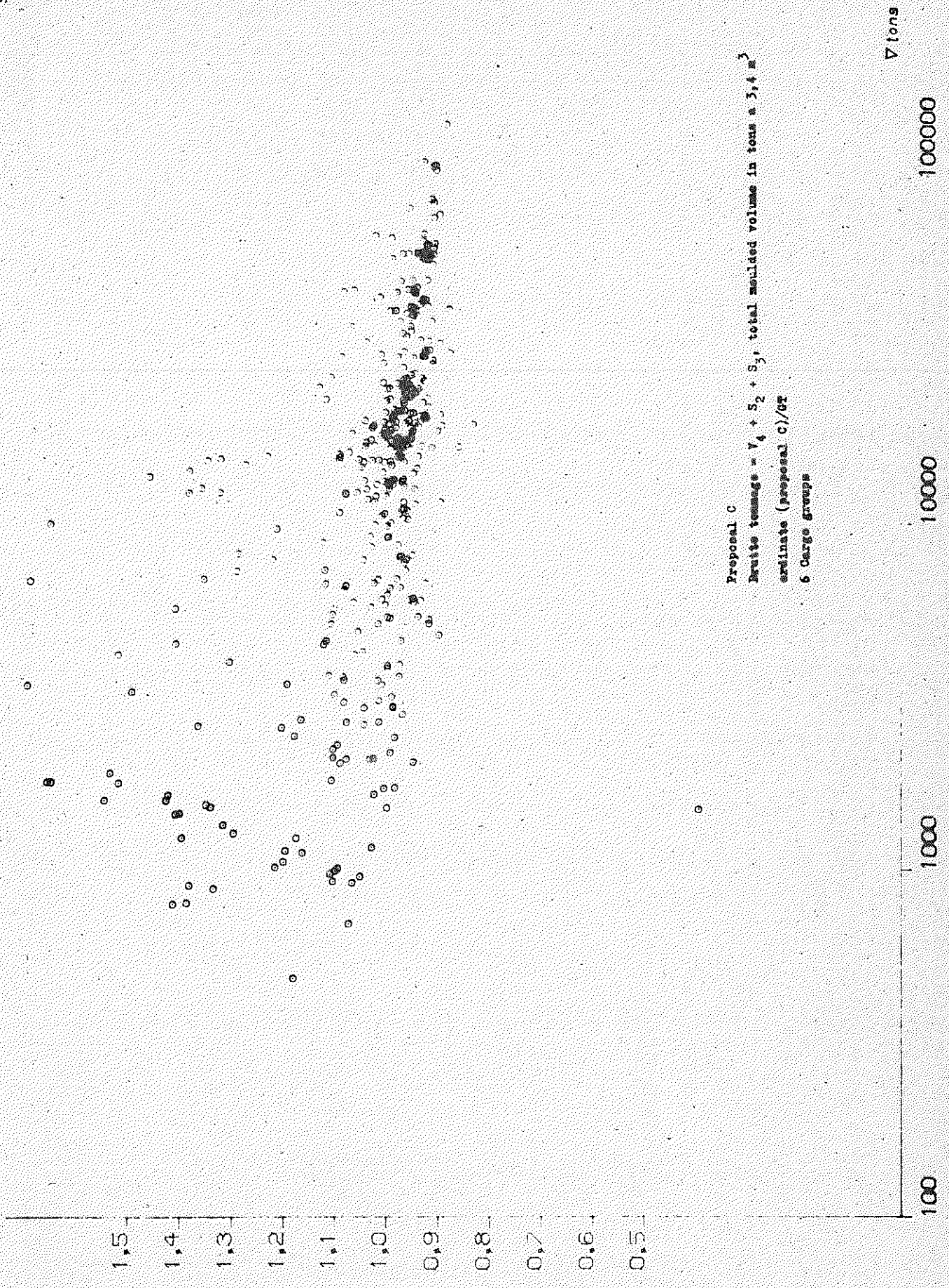
V tons

Proposal C

$GF = V_1 + S_2 + S_3$, total moulded volume in tons a 3,4 m³

estimate: (proposal C)/52

All ships included



Proposal C
 Brutto tonnage = $V_4 + S_2 + S_3$, total moulded volume in tons a $3,4 \text{ m}^3$
 ordinate (proposal c)/GT
 6 Cargo Groups

V tons

1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5

100

1000

10000

100000

V tons

Proposal C

Proposed Gross tonnage = $V_4 + S_2 + S_3$, total loaded volume, in tons
a 3,4 M

ordinate: (Proposal C)/gr

4 Passenger Groups

