INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION

IMCO

TM/CONF/C.2/WP.19/Add.3
15 June 1969
Original: ENGLISH

INTERNATIONAL CONFERENCE ON TONNAGE MEASUREMENT, 1969

Technical Committee

PROGRESS REPORT OF THE WORKING GROUP ON GROSS AND NET TONNAGE (PART IV)

18. On 12 June the Working Group was instructed by the Technical Committee to concentrate its further efforts on the following items:

(a) to consider the formula for gross tonnage:

$$GT = (A + B \log_{10} V)V \text{ and}$$

to propose figures for the two coefficients which would bring gross tonnage of new ships as close as possible to existing ones;

(b) to consider the formula for net tonnage:

$$NT = K_2(V_C)\frac{D}{D_{LL}} + K_3P$$

(i) to propose a suitable expression and figures for $\frac{D}{D_{LL}}$;

(ii) to propose a constant or variable coefficient and figure(s) which would bring the net tonnage of new ships as close as possible to existing ones;

(iii) to propose a formula of the passenger term;

(iv) to propose a figure for the lower limit of net tonnage.

Gross tonnage formula

19. After having carried out computer exercises with a number of log type coefficients the Working Group decided to recommend the following coefficient:

$$0.2 + 0.02 \log_{10} V$$

The results of the exercise are shown in Annex I of TM/CONF/C.2/WP.19 and the scatter diagram is given in TM/CONF/C.2/WP.26.

Net tonnage formula

20. (a) The Working Group took note of the definition of the upper deck agreed by the Technical Committee as shown in TM/CONF/C.2/WP.37.

(b) As to the coefficient K_2 in the net tonnage formula the Working Group carried out computer exercises with a number of coefficients and finally agreed to recommend:

$$0.2 + 0.02 \log_{10} V$$

The results of the computer exercise using this coefficient are shown in Annex X, the scatter diagram will be given in TM/CONF/C.2/WP.19/Add.4.

(c) The Working Group investigated the introduction of a factor to take account of ships assigned a freeboard in excess of the minimum freeboard. It was agreed to recommend the following factor:

$$\left(\frac{4d}{3D}\right)^3$$

subject to an upper limit of unity. The meanings of d and D are as shown in Annex XIII.

The evaluation of the above ratio was based upon the data shown in Annex XI.

(d) The Working Group took note of the Technical Committee's decision to include in the passenger term three categories of passengers:

- passengers (N_1) in cabins with not more than 8 berths;
- passengers (N_2) in dormitories with more than 8 berths;
- unberthed passengers (N_3).

As no data were available for this passenger distribution the exercise was carried out for the formula

$$(N_b + \frac{N_u}{10})$$

where $N_b = N_1 + N_2$

$N_u = N_3$.

Provided that the term $K_2(V_c)\frac{D}{D_{LL}}$ should never be taken less than 0.25GT, the Working Group agreed to recommend for the coefficient:

$$K_3 = 1.25\,\frac{GT + 10,000}{10,000}$$

A graph is shown in diagram I of TM/CONF/C.2/WP.44 where B stands for K_3.

(e) The Working Group recommended that the lower limit for net tonnage should be 30 per cent of the gross tonnage. The ratio of net tonnage to gross tonnage is shown in the scatter diagrams at Annex XII. It should be noted that in the diagrams for open shelterdeckers the existing net tonnage has been used instead of the net tonnage according to the proposed formula.

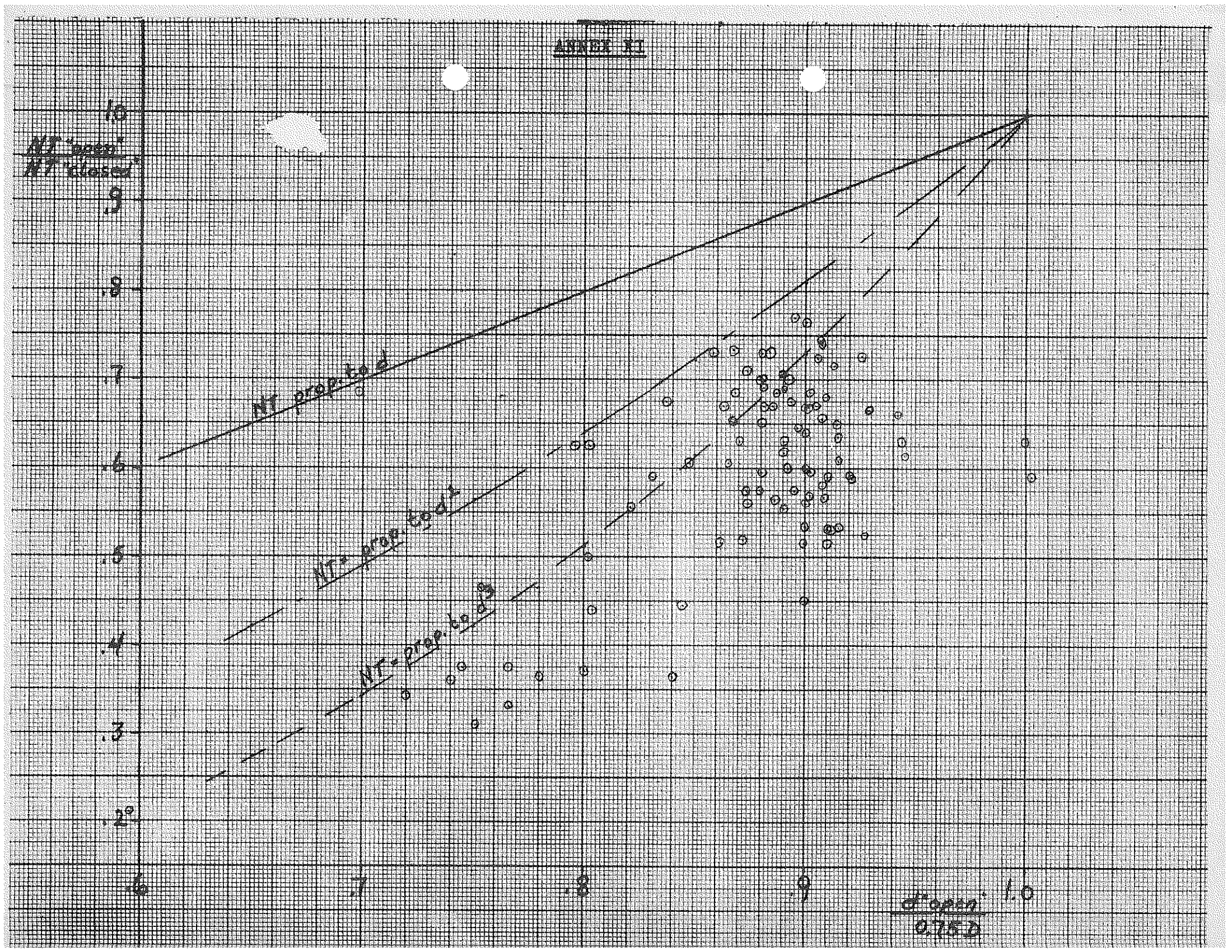
21. In the light of its findings the Working Group reviewed Regulation 4 as proposed on page 6 of TM/CONF/C.2/WP.37 and recommended amendments of that Regulation as shown at Annex XIII.

$$NT = (0.2 + 0.02 \log_{10} V_c)V_c$$

Total No. of ships	302
No. of ships retained	288
Percentage of mean deviation	2.364
SD_o	8.758
SD_m	8.432
Fleet per cent change	1.547

Note: IMCO fleet excluding all types of passenger ships, reefers and open shelter deckers.
In the exercises the grain cubic capacity below the upper deck but including hatchways was used as the IMCO data did not include the total moulded volume of cargo spaces.

ANNEX XI


1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
.6
.7
.8
.9
1.0
Nr "open"
Nr "closed"
d "open"
0.75 D
Nr prop. to d
Nr " prop. to d²
Nr " prop. to d³
Nr " prop. to d⁴

ANNEX XII

In this Annex, 6 scatter diagrams for the following types of ships:

Tankers

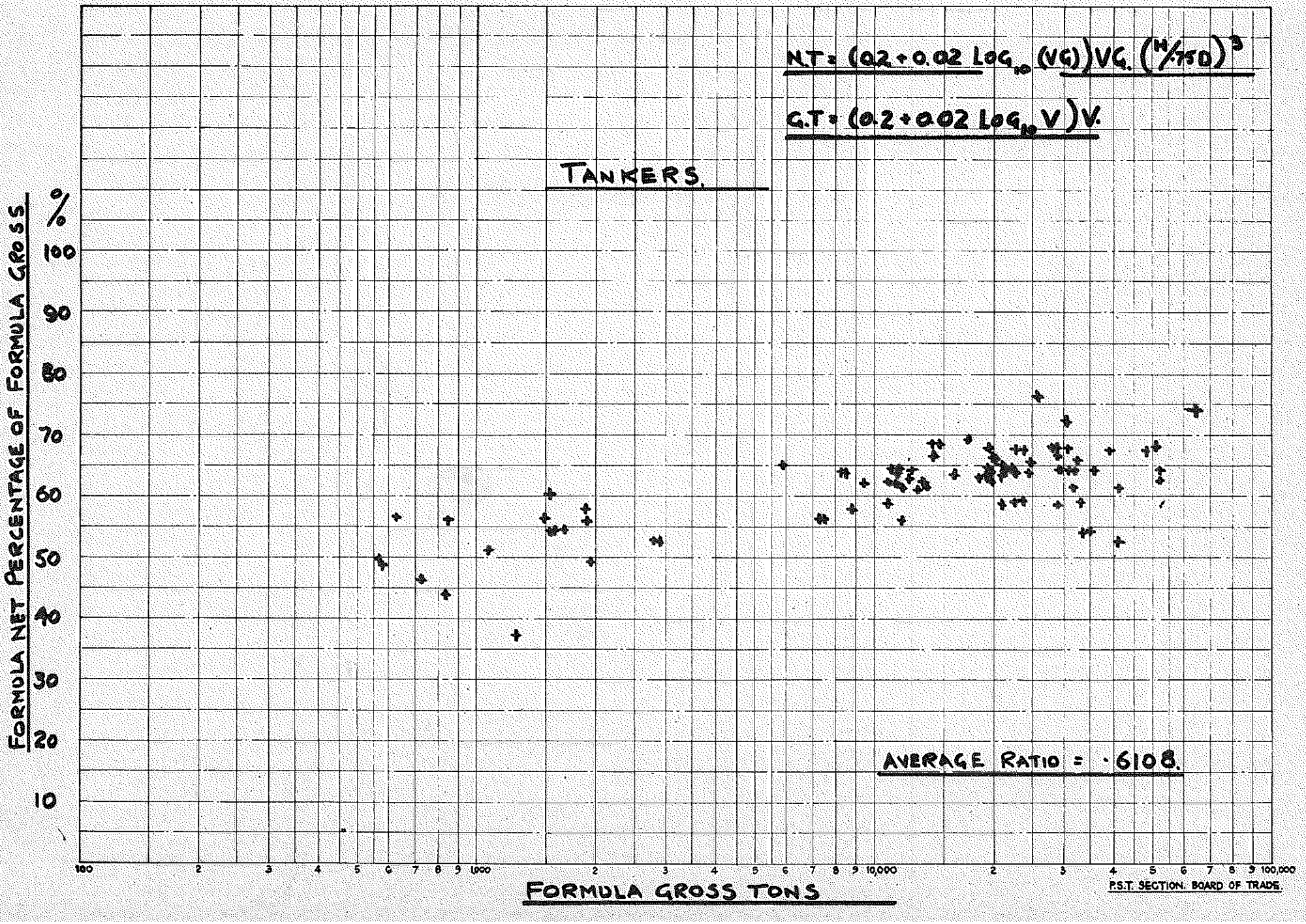
Bulk carriers

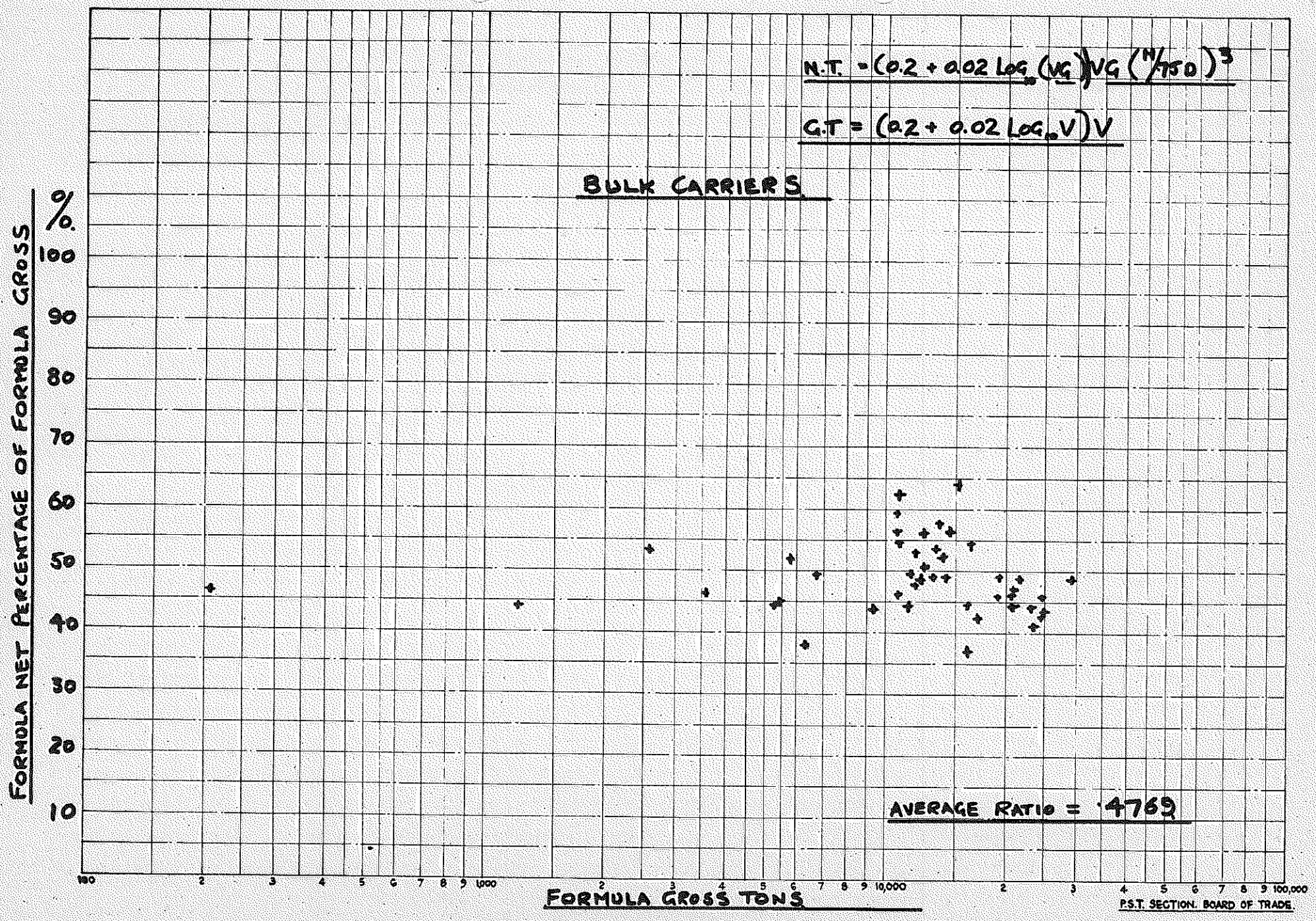
Ore carriers

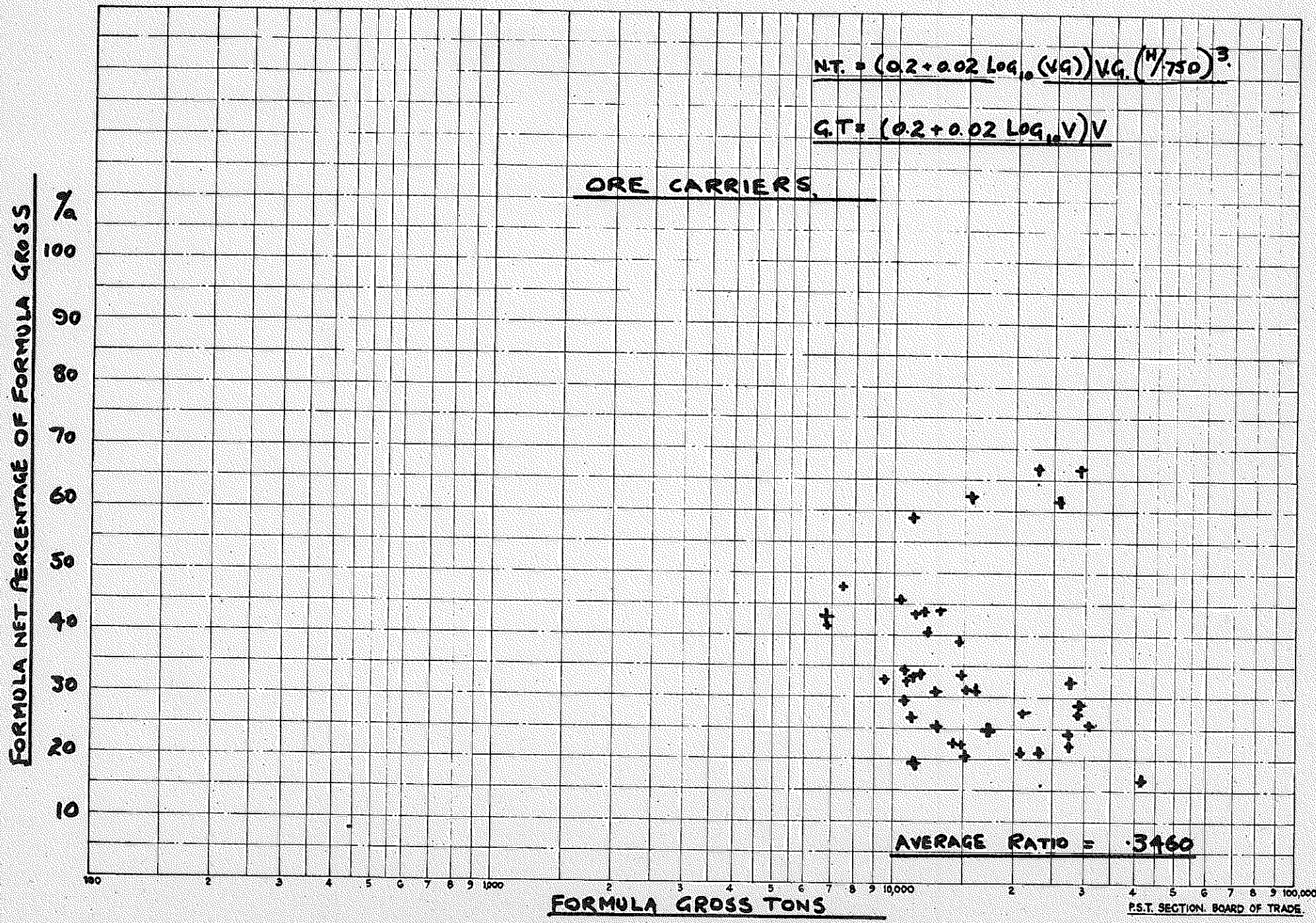
Raised quarterdeckers

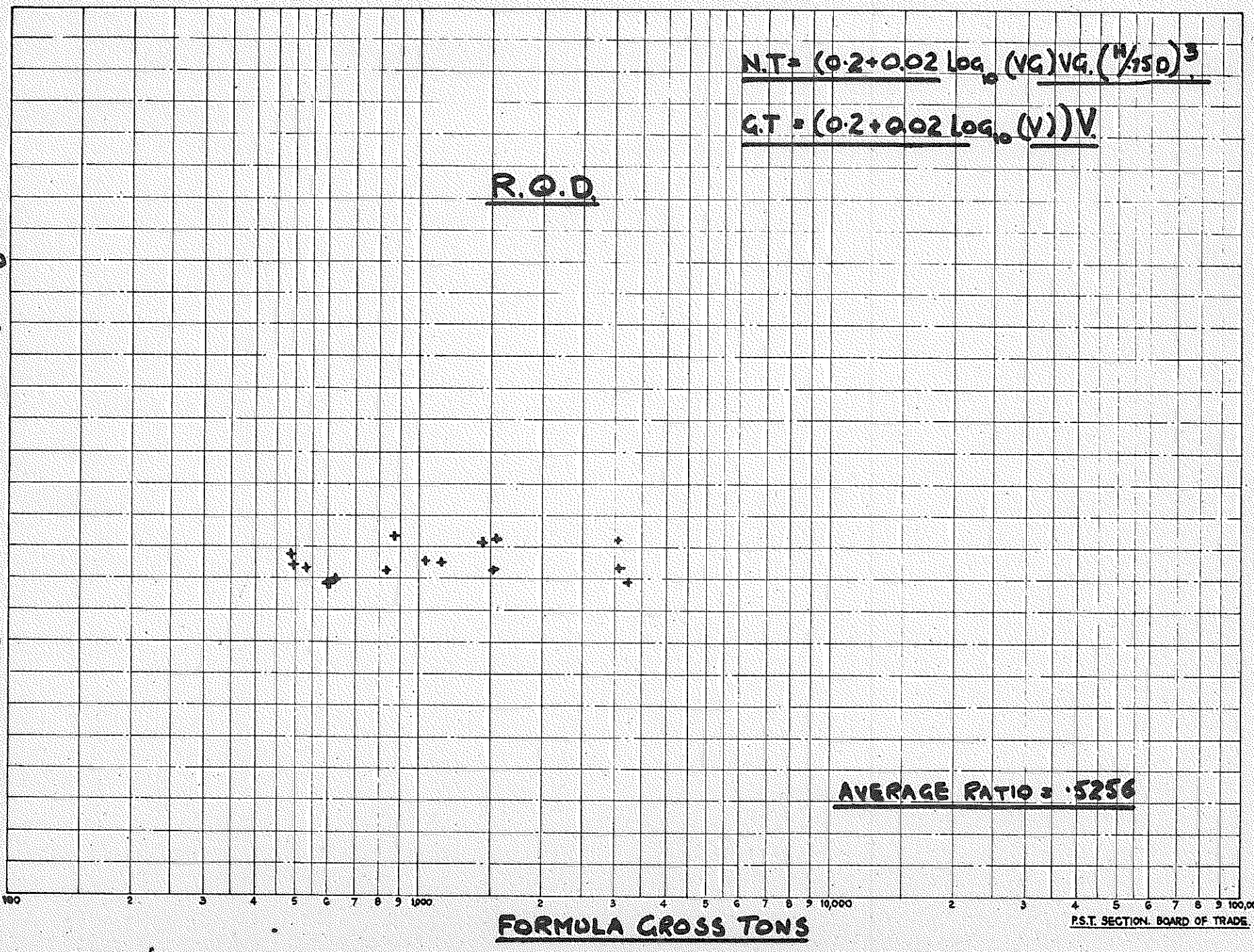
Cargo ships

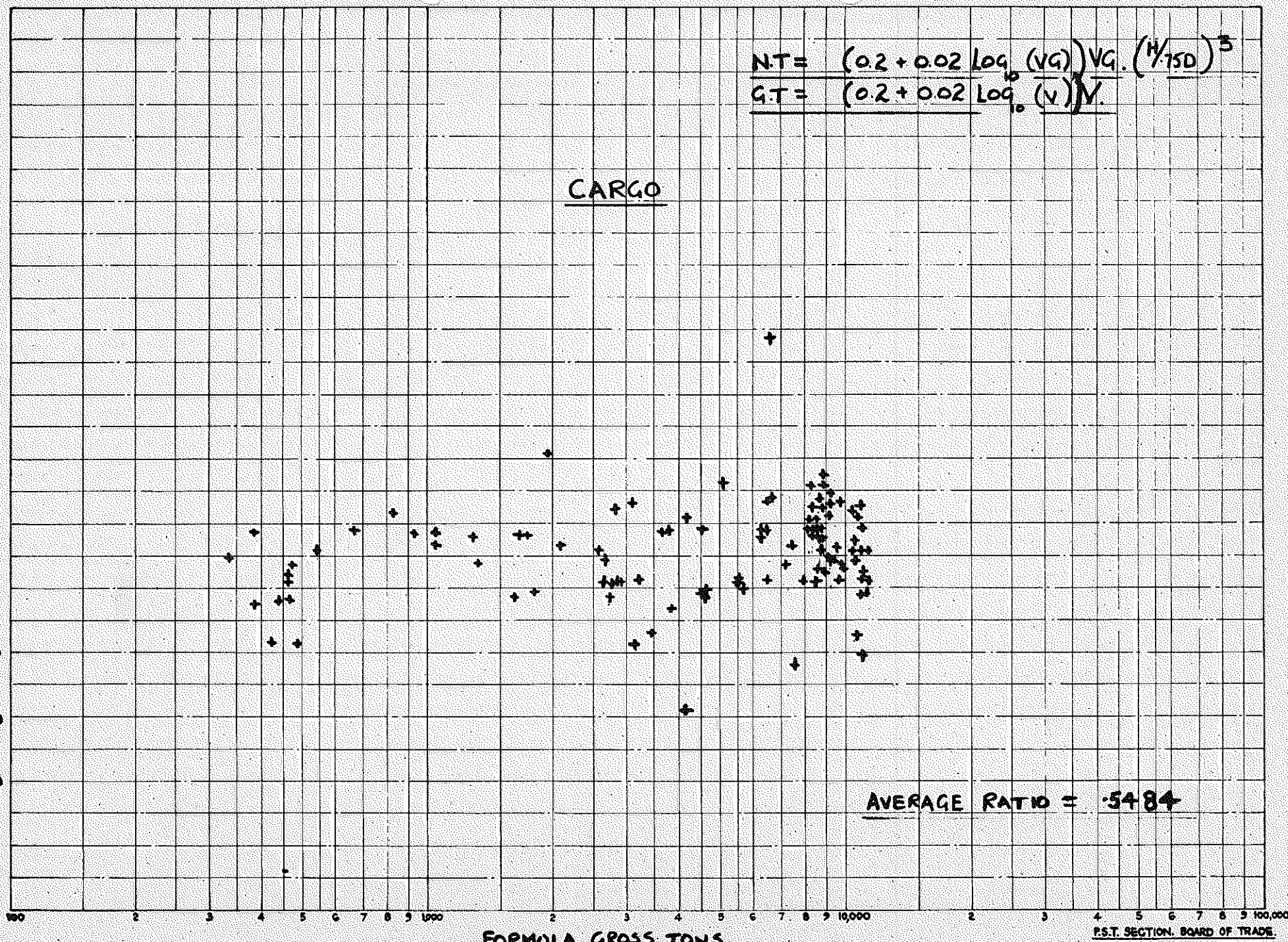
Shelterdeckers

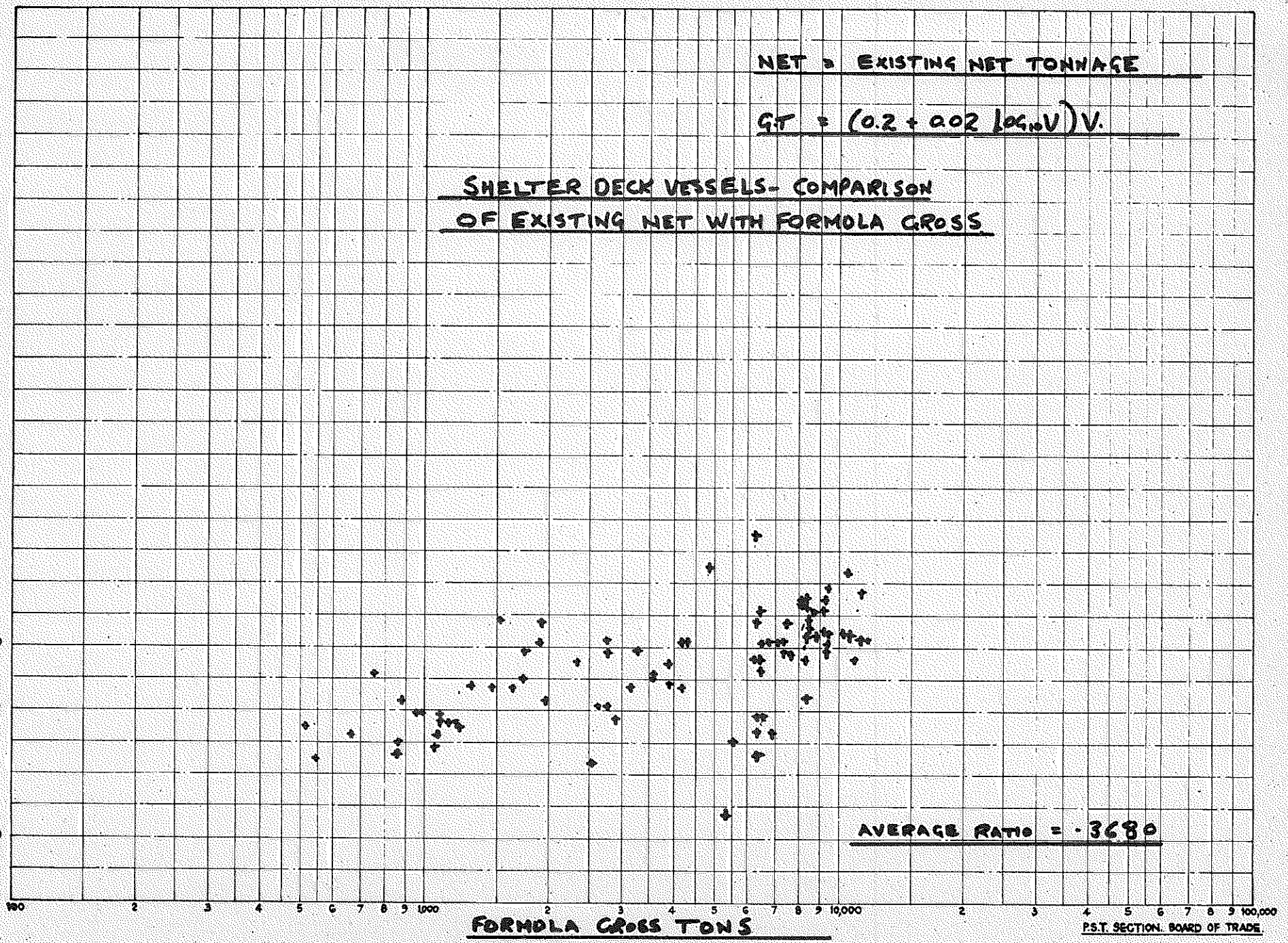

N.T = (0.2 + 0.02 Log10 (VG)) VG. (M/75D)^3
G.T = (0.2 + 0.02 Log10 V) V.
TANKERS.
AVERAGE RATIO = .6108.
FORMULA NET PERCENTAGE OF FORMULA GROSS
%
100
90
80
70
60
50
40
30
20
10
100
2
3
4
5
6
7
8
9
1000
2
3
4
5
6
7
8
9
10,000
2
3
4
5
6
7
8
9
100,000
FORMULA GROSS TONS
P.S.T. SECTION. BOARD OF TRADE.


N.T. = (0.2 + 0.02 Log10 (VG)) VG ((4/15D)^3
G.T = (0.2 + 0.02 Log10 V) V
BULK CARRIERS
FORMULA NET PERCENTAGE OF FORMULA GROSS
%
100
90
80
70
60
50
40
30
20
10
100
2
3
4
5
6
7
8
9
1000
2
3
4
5
6
7
8
9
10,000
2
3
4
5
6
7
8
9
100,000
FORMULA GROSS TONS
AVERAGE RATIO = ·4769
P.S.T. SECTION. BOARD OF TRADE.


N.T. = (0.2 + 0.02 Log10 (VG)) V.G. (H/750)^3.
G.T = (0.2 + 0.02 Log10 V) V
ORE CARRIERS.
FORMULA NET PERCENTAGE OF FORMULA GROSS
%
100
90
80
70
60
50
40
30
20
10
100
2
3
4
5
6
7
8
9
1,000
2
3
4
5
6
7
8
9
10,000
2
3
4
5
6
7
8
9
100,000
FORMULA GROSS TONS
AVERAGE RATIO = .3460
P.S.T. SECTION. BOARD OF TRADE.


N.T = (0·2 + 0.02 Log10 (VG)) VG. (H/15D)²
G.T = (0·2 + 0.02 Log10 (V)) V.
R.Q.D.
AVERAGE RATIO = ·5256
FORMULA NET PERCENTAGE OF FORMULA GROSS
%
100
90
80
70
60
50
40
30
20
10
100
2
3
4
5
6
7
8
9
1,000
2
3
4
5
6
7
8
9
10,000
2
3
4
5
6
7
8
9
100,000
FORMULA GROSS TONS
P.S.T. SECTION. BOARD OF TRADE.


N.T = (0.2 + 0.02 Log10 (VG)) VG . (H/75D)^3
G.T = (0.2 + 0.02 Log10 (V)) V.
CARGO
FORMULA NET PERCENTAGE OF FORMULA GROSS
%
100
90
80
70
60
50
40
30
20
10
AVERAGE RATIO = .5484
100
2
3
4
5
6
7
8
9
1,000
2
3
4
5
6
7
8
9
10,000
2
3
4
5
6
7
8
9
100,000
FORMULA GROSS TONS
P.S.T. SECTION. BOARD OF TRADE.


NET = EXISTING NET TONNAGE
GT = (0.2 + 0.02 log10V) V.
SHELTER DECK VESSELS - COMPARISON OF EXISTING NET WITH FORMOLA GROSS
EXISTING NET PERCENTAGE OF FORMULA GROSS
%
100
90
80
70
60
50
40
30
20
10
100
2
3
4
5
6
7
8
9
1000
2
3
4
5
6
7
8
9
10,000
2
3
4
5
6
7
8
9
100,000
FORMOLA GROSS TONS
AVERAGE RATIO = .3680
P.S.T. SECTION. BOARD OF TRADE.

ANNEX XIII

PROPOSED AMENDMENT TO REGULATION 4
(PAGE 6 OF TM/CONF/C.2/WP.37)

Regulation 4

Net Tonnage

(1) The net tonnage of a ship NT [in register tons] shall be determined by the following formula:

$$NT = K_2 V_c \left(\frac{4d}{3D}\right)^3 + K_3 \left(N_1 + \frac{N_2}{6} + \frac{N_3}{10}\right)$$

In this formula the factor $\left(\frac{4d}{3D}\right)^3$ is not to be taken greater than unity, the value of the term $K_2 V_c \left(\frac{4d}{3D}\right)^3$ is not to be taken less than 0.25GT, and the net tonnage is not to be taken less than 0.30GT,

where V_c = total volume of cargo spaces in cubic metres

$K_2 = 0.2 + 0.02 \log_{10} V_c$

$K_3 = 1.25 \frac{GT + 10,000}{10,000}$

d = moulded draught of the ship in metres as defined in paragraph 2 of this Regulation,

D = moulded depth of the ship amidships as defined in Regulation 2(2) in metres,

N_1 = total number of passengers [other than passengers in dormitories with more than eight berths in each cabin and] other than passengers without berths,

$[N_2]$ = total number of passengers in dormitories with more than eight berths in each dormitory],

N_3 = total number of passengers without berths,

$N_1[+ N_2]+N_3$ = total number of passengers the ship is permitted to carry as indicated in the ships certificate,

GT = gross tonnage of the ship [in register tons] as obtained from Regulation 3.

(2) The moulded draught d of the ship referred to in paragraph (1) of this Regulation shall be one of the following draughts:

(i) for ships to which the International Convention on Load Lines in force applies, the draught corresponding to the Summer Load Line other than timber load line assigned in accordance with that Convention;

(ii) for passenger ships, the draught corresponding to the deepest subdivision load line assigned in accordance with the International Convention for the Safety of Life at Sea in force or other international agreement where applicable;

(iii) for ships to which the International Convention on Load Lines does not apply but which have been assigned a load line in compliance with national requirements, the draught corresponding to the Summer Load Line so assigned;

(iv) for ships to which no load line is assigned but the draught of which is restricted in compliance with national requirements, the maximum permitted draught; or

(v) for other ships, 75 per cent of the moulded depth as defined in Regulation 2.