3.6 LPG Ship

Figure 3-85 to **Figure 3-87** show the results of analysis of Loa, B, and d for GT. And the following are the analysis method applied to each main dimension and the range of the ship classes to which each method was applied. **Table 3-12** shows the results of analysis of each main dimension according to the ship class that was set.

(1) Loa, Lpp (**Figure 3-88,89**)
All ship classes were analyzed by the logarithmic regression analysis method, obtaining $R^2 = 0.979$ for Loa and $R^2 = 0.978$ for Lpp.

(2) B (**Figure 3-90**)
All ship classes were analyzed by the logarithmic regression analysis method, obtaining $R^2 = 0.971$.

(3) d (**Figure 3-91**)
All ship classes were analyzed by the logarithmic regression analysis method, obtaining $R^2 = 0.869$.

Table 3-12   The results of analysis of main dimensions (LPG Ship)

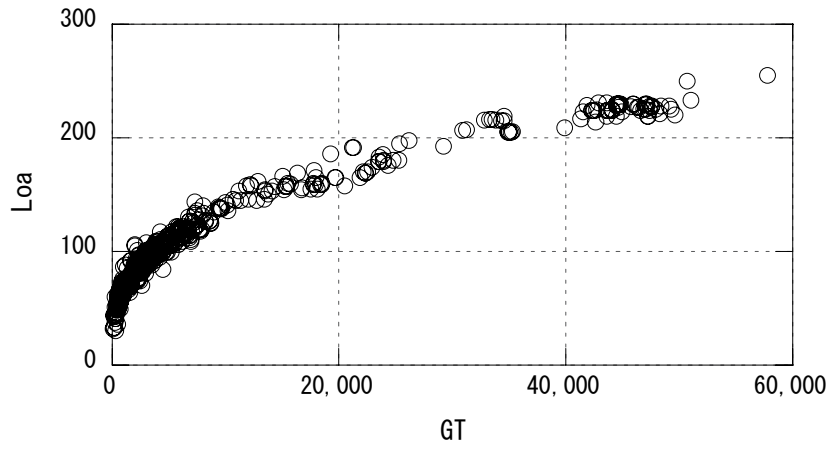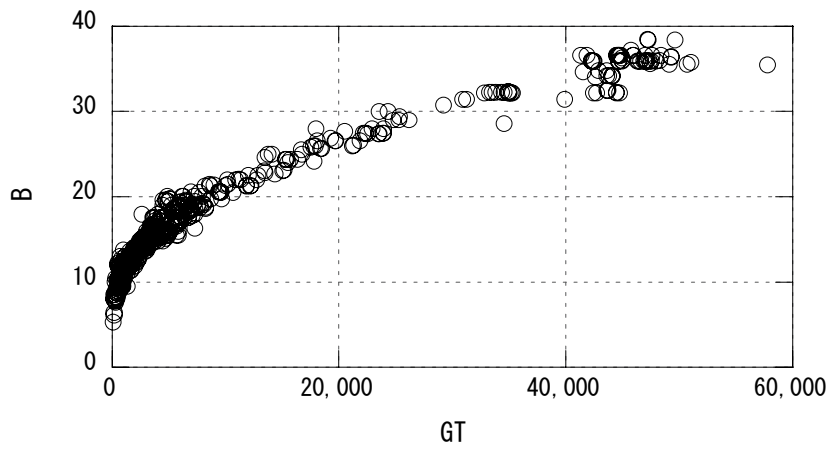| Gross Tonnage (t)	Length Overall (m)	Length P.P. (m)	Breadth Molded (m)	Full Load Draft (m)
3,000	98	92	16.1	6.3
5,000	116	109	18.6	7.3
10,000	144	136	22.7	8.9
20,000	179	170	27.7	10.8
30,000	204	193	31.1	12.1
40,000	223	212	33.8	13.1
50,000	240	228	36.0	14.0

Figure 3-85   LPG Ship   Loa-GT
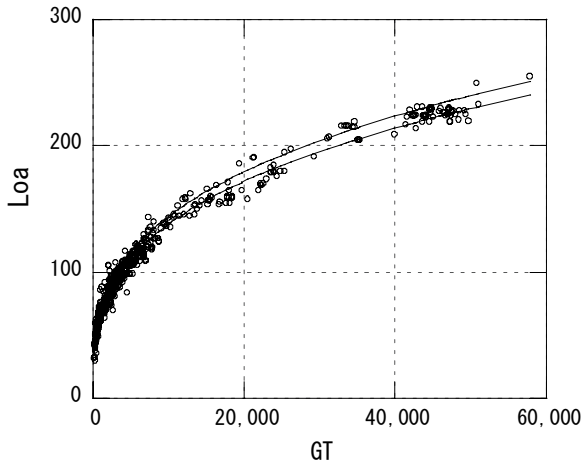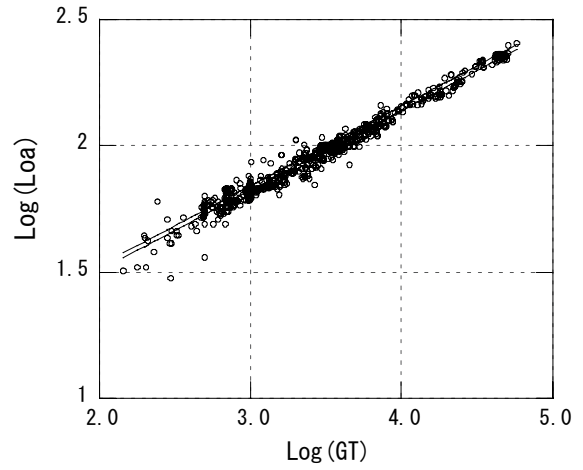

Figure 3-86   LPG Ship   B-GT
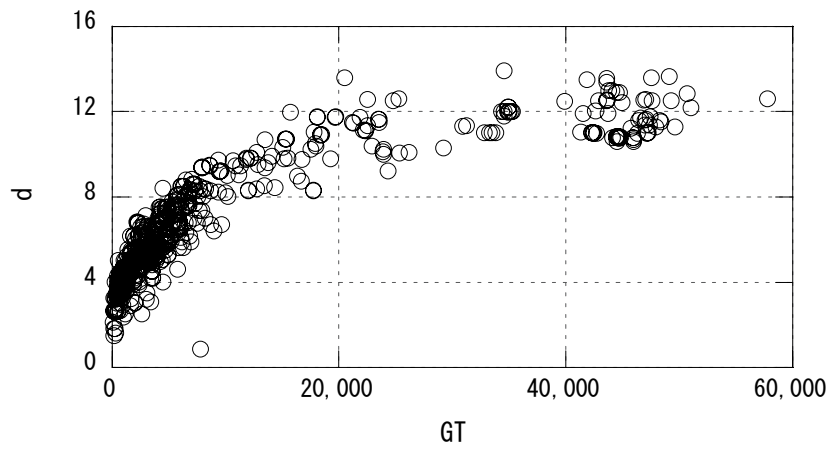
Figure 3-87   LPG Ship   d-GT

$$Y=\alpha \cdot X^{\beta}$$

	50%	75%
α	7.4513	7.7815
β	0.3168	0.3168

logY=a+blogX

(R^2= 0.979 , σ= 0.028)

	50%	75%
a	0.8722	0.8911
b	0.3168	0.3168

Figure 3-88 LPG Ship   Loa-GT

$$Y=\alpha \cdot X^{\beta}$$

	50%	75%
α	6.6538	6.9589
β	0.3225	0.3225

logY=a+blogX
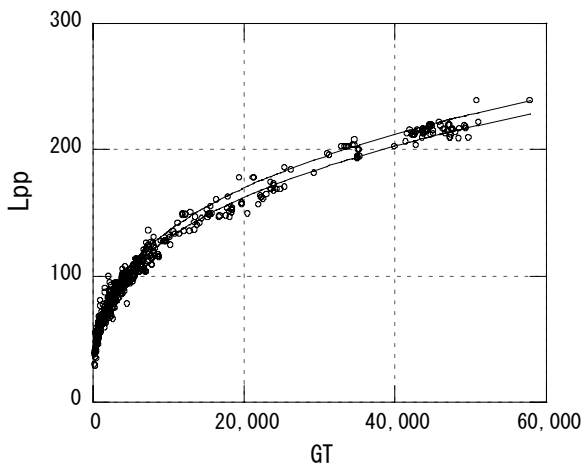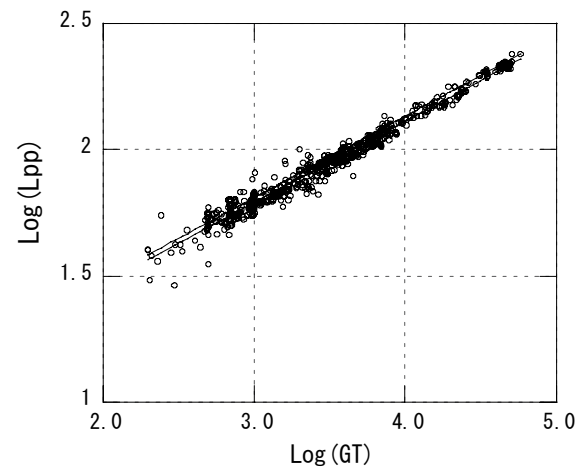
(R^2= 0.978 , σ= 0.029)

	50%	75%
a	0.8231	0.8425
b	0.3225	0.3225

Figure 3-89 LPG Ship   Lpp−GT

$Y=\alpha \cdot X^{\beta}$

	50%	75%
α	1.5610	1.6348
β	0.2858	0.2858

logY=a+blogX
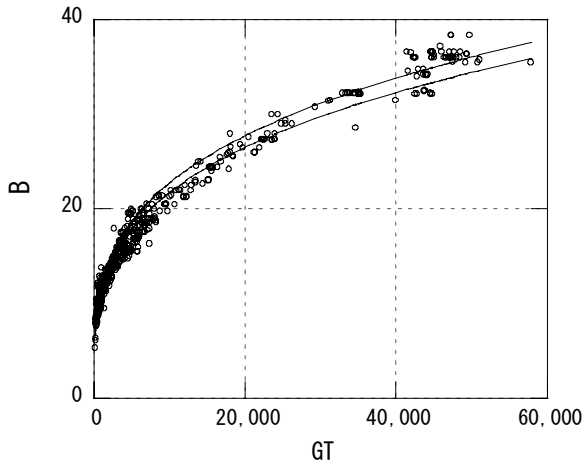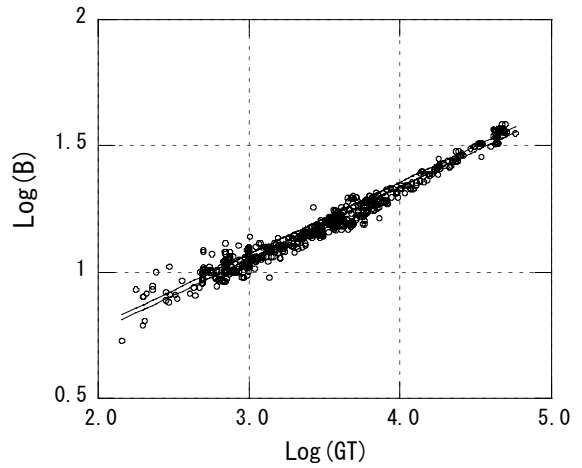
($R^2=$ 0.971 , σ= 0.030)

	50%	75%
a	0.1934	0.2135
b	0.2858	0.2858

Figure 3-90　LPG Ship　B−GT

$Y=\alpha \cdot X^{\beta}$

	50%	75%
α	0.5867	0.6501
β	0.2837	0.2837

logY=a+blogX
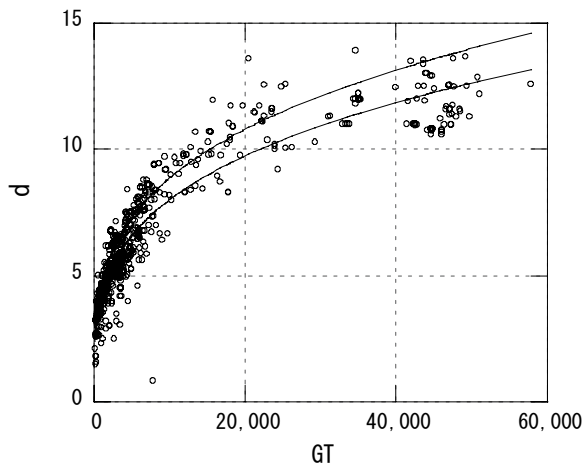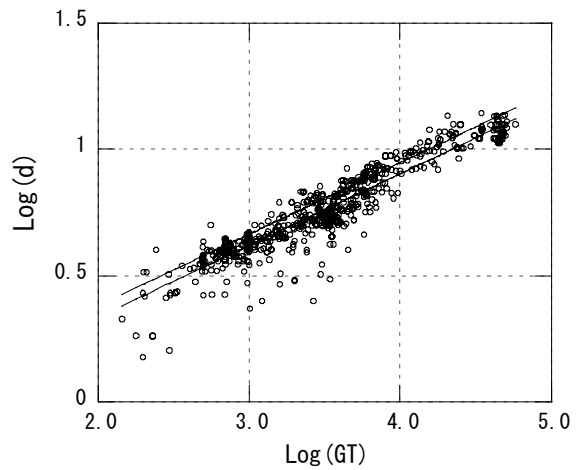
($R^2=$ 0.869 , σ= 0.066)

	50%	75%
a	-0.2316	-0.1870
b	0.2837	0.2837

Figure 3-91　LPG Ship　d−GT

3.7 LNG Ship

Figure 3-92 to **Figure 3-94**show the results of analysis of Loa, B, and d for GT. And the following are the analysis method applied to each main dimension and the range of the ship classes to which each method was applied. **Table 3-13** shows the results of analysis of each main dimension according to the ship class that was set.

(1) Loa, Lpp (**Figure 3-95**, **96**)
All ship classes were analyzed by the logarithmic regression analysis method, obtaining $R^2 = 0.968$ for Loa and $R^2 = 0.972$ for Lpp.

(2) B (**Figure 3-97**)
All ship classes were analyzed by the logarithmic regression analysis method, obtaining $R^2 = 0.986$.

(3) d (**Figure 3-98**)
All ship classes were analyzed by the logarithmic regression analysis method, obtaining $R^2 = 0.894$.

Table 3-13　The results of analysis of main dimensions(LNG Ship)

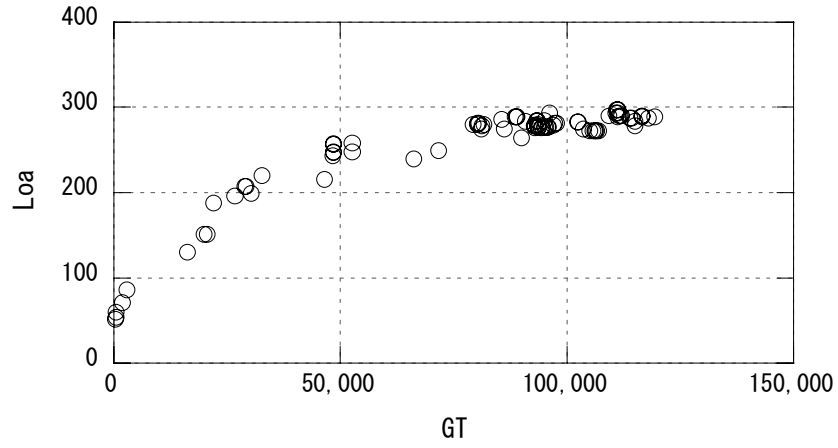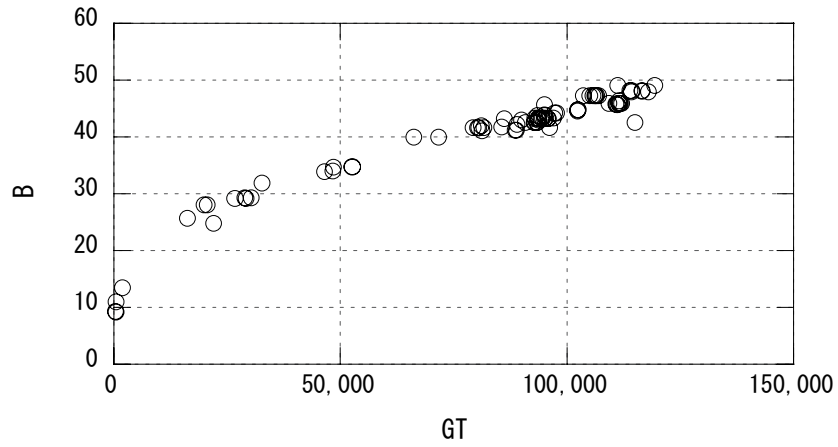| Gross Tonnage (t)	Length Overall (m)	Length P.P. (m)	Breadth Molded (m)	Full Load Draft (m)
20,000	174	164	27.8	8.4
30,000	199	188	31.4	9.2
50,000	235	223	36.7	10.4
80,000	274	260	42.4	11.5
100,000	294	281	45.4	12.1

Figure 3-92　LNG Ship　Loa-GT
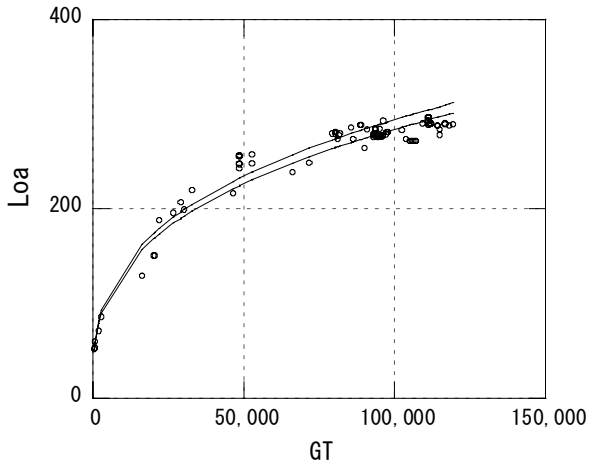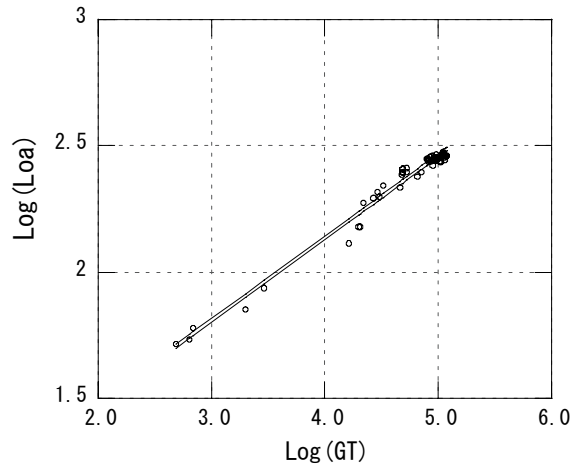
Figure 3-93　LNG Ship　B-GT
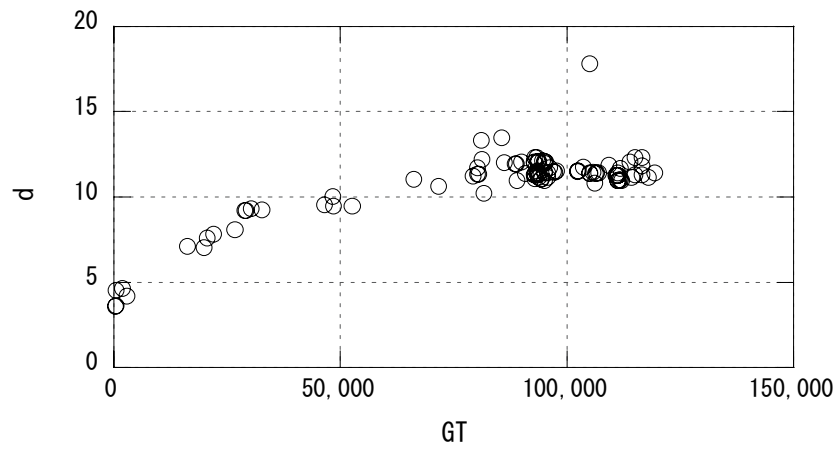
Figure 3-94　LNG Ship　d-GT

$Y=\alpha\cdot X^\beta$

	50%	75%
α	6.6137	6.8499
β	0.3266	0.3266

logY=a+blogX

(R^2= 0.968 , σ= 0.023)

	50%	75%
a	0.8204	0.8357
b	0.3266	0.3266

Figure 3-95 LNG Ship Loa-GT

$Y=\alpha\cdot X^\beta$

	50%	75%
α	5.8183	6.0194
β	0.3337	0.3337

logY=a+blogX
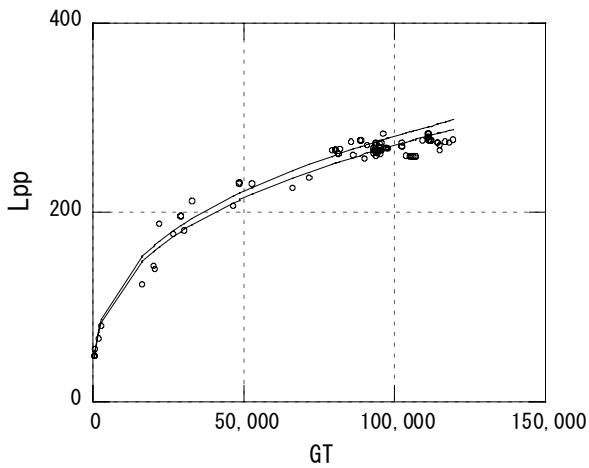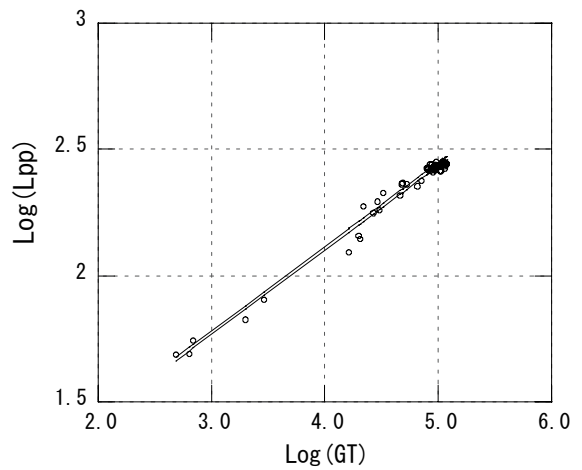
(R^2= 0.972 , σ= 0.022)

	50%	75%
a	0.7648	0.7796
b	0.3337	0.3337

Figure 3-96 LNG Ship Lpp-GT

$$Y=\alpha \cdot X^{\beta}$$

	50%	75%
α	1.3359	1.3633
β	0.3044	0.3044

logY=a+blogX
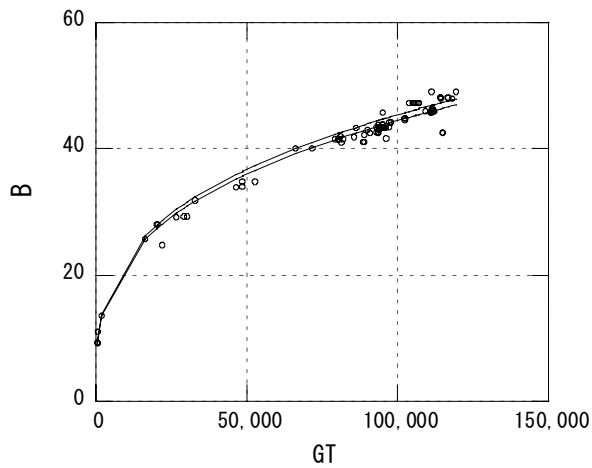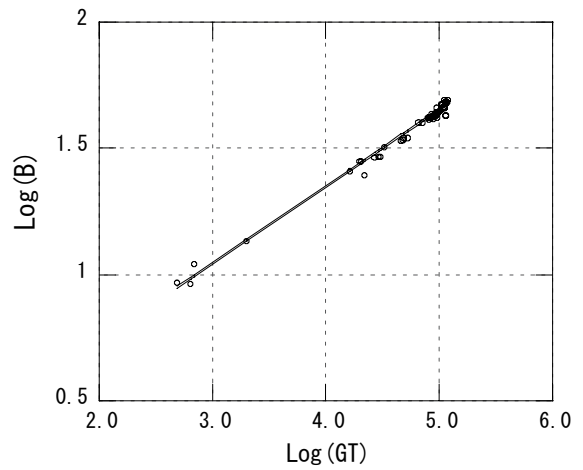
(R^2= 0.986 , σ= 0.013)

	50%	75%
a	0.1258	0.1346
b	0.3044	0.3044

Figure 3-97　LNG Ship　B－GT

$$Y=\alpha \cdot X^{\beta}$$

	50%	75%
α	0.8437	0.8839
β	0.2274	0.2274

logY=a+blogX
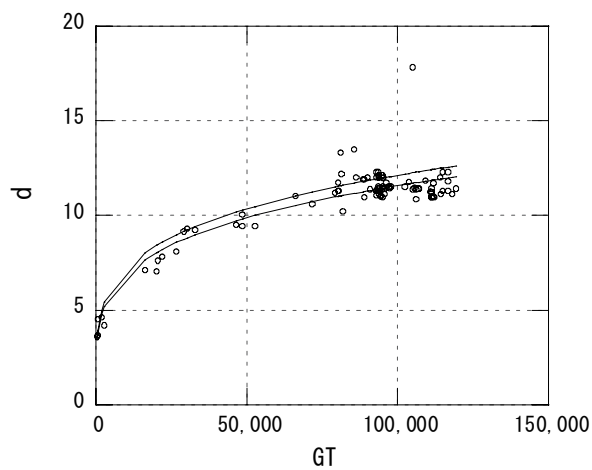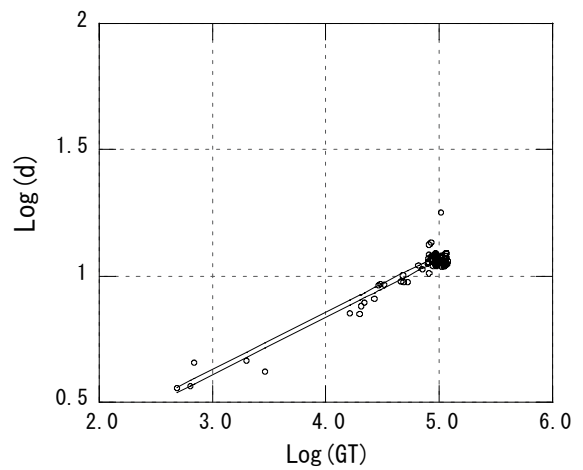
(R^2= 0.894 , σ= 0.030)

	50%	75%
a	-0.0738	-0.0536
b	0.2274	0.2274

Figure 3-98　LNG Ship　d－GT

3.8 Passenger Ship

Figure 3-99 to **Figure 3-101** show the results of analysis of Loa, B, and d for GT. And the following are the analysis method applied to each main dimension and the range of the ship classes to which each method was applied. **Table 3-14** shows the results of analysis of each main dimension according to the ship class that was set.

(1) Loa, Lpp (**Figure 3-102,103**)
All ship classes (less than 100,000GT) were analyzed by the logarithmic regression analysis method, obtaining R^2 = 0.942 for Loa and R^2 = 0.905 for Lpp.

(2) B (**Figure 3-104**)
The ships were divided into two classes with 50,000GT as the boundary, and less than 50,00GT was analyzed by the logarithmic regression analysis method, obtaining R^2 = 0.772. 50,000GT or more and less than 100,000GT was analyzed by the average value analysis method. And for 50,000DWT to 100,000DWT classes, instead of the average value, 32.3 m was used, assuming they are Panamax type.

(3) d (**Figure 3-105**)
The ships were divided into three classes with 20,000GT and 60,000GT as the boundaries, and less than 20,000GT was analyzed by the logarithmic regression analysis method, obtaining R^2 = 0.651. 20,000GT or more and less than 60,000GT and 60,000GT or more and less than 100,000GT were analyzed by the average value analysis method.

Table 3-14 The results of analysis of main dimensions(Passenger Ship)

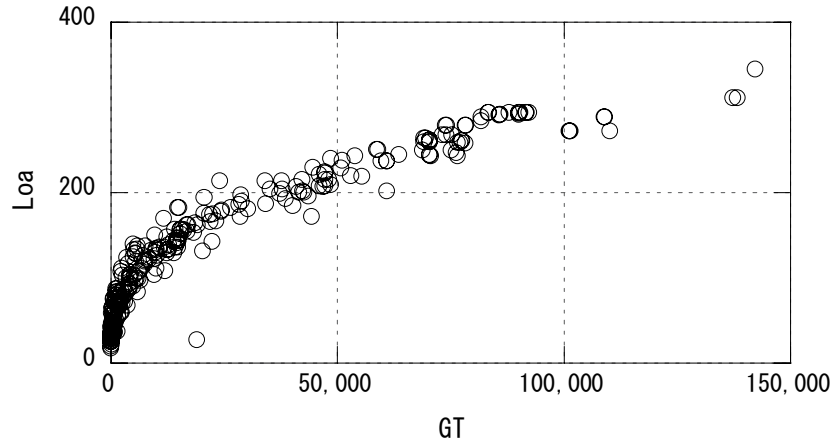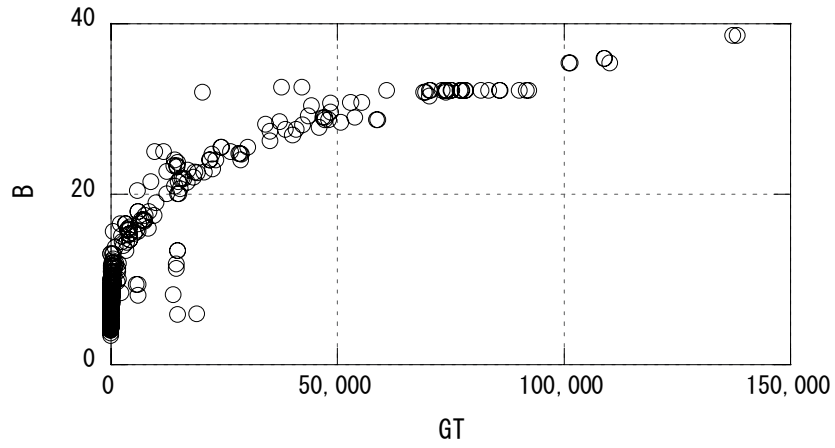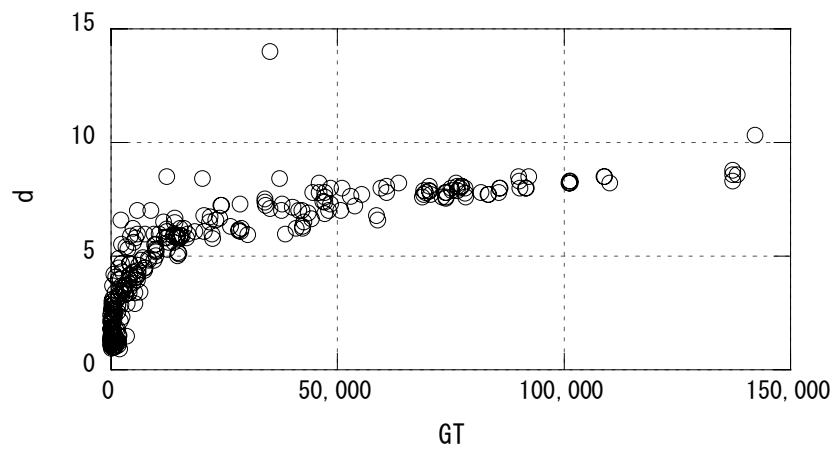| Gross Tonnage (t)	Length Overall (m)	Length P.P. (m)	Breadth Molded (m)	Full Load Draft (m)
3,000	97	88	16.5	4.3
5,000	115	104	18.6	5.0
10,000	146	131	21.8	6.4
20,000	186	165	25.7	7.8
30,000	214	189	28.2	7.8
50,000	255	224	32.3	7.8
70,000	286	250	32.3	8.1
100,000	324	281	32.3	8.1

Figure 3-99 Passenger Ship Loa-GT

Figure 3-100 Passenger Ship B-GT

Figure 3-101 Passenger Ship d-GT