

SILVA FENNICA

Vol. 11 1977 N:o 1

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SUOMEN METSÄTIETEELLINEN SEURA
SOCIETY OF FORESTRY IN FINLAND

Silva Fennica

A QUARTERLY JOURNAL FOR FOREST SCIENCE

PUBLISHER:

THE SOCIETY OF FORESTRY IN FINLAND

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Silva Fennica is published quarterly. It is sequel to the Series, vols. 1 (1926)–120(1966). Its annual subscription price is 30 Finnish marks. The Society of Forestry in Finland also publishes *Acta Forestalia Fennica*. This series appears at irregular intervals since the year 1913 (vol. 1).

Orders for back issues of the publications of the Society, subscriptions and exchange inquiries can be addressed to the office.

Silva Fennica

NELJÄNNE SVUOSITTAIN ILMESTYVÄ METSÄTIETEELLINEN
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Tilauksia ja julkaisuja koskevat tiedustelut osoitetaan Seuran toimistolle. *Silva Fennican* tilaushinta on 30 mk.

FINNISH INLAND WATERWAY FLEET IN 1975

An analysis with special reference to wood transporting vessels

YRJÖ ROITTO

RESUME:

LA BATELLERIE FINLANDAISE POUR VOIES NAVIGABLES INTERIEURES
EN 1975, AVEC REFERENCE SPECIALE AUX BATIMENTS TRANSPORTANT
LE BOIS.

SELOSTE:

SUOMEN SISÄVESIEN ALUSKANTA 1975. PUUNKULJETUSALUKSIA KOSKEVA
SELVITYS.

Saapunut toimitukselle 1976-12-27

The paper describes the Finnish inland waterway fleet in 1975. The number of inspected vessels was then 778. Of those 495 were tugs, 118 passenger boats, 71 warping boats with the others totalling 94. The average power of tugs was 65 kW and that of warping boats 16 kW. Other statistical data are presented in the tables.

1. INTRODUCTION

Finland is called the country of a thousand lakes. Actually, the lakes number some 55 000, depending on how they are defined. In 1975, roundwood transport in Finland (mostly floating on inland waters) still accounted for 45 per cent of the total transport performance and for 25 per cent of the total transport volume (TUOVINEN 1976, p. 2). In the same year, passenger traffic totalled 26,7 mill. passenger km and about 307 000 persons (Kotimaan . . . p. 4). There are, however, no annual statistics on the Finnish inland waterway fleet. It is difficult to understand why they have not been published. Such statistics are needed

in Finland for several purposes, and it is a pity that Finland continues to be unable to furnish ECE with these data. As shown earlier, collecting data on the Finnish inland waterway fleet and publishing them does not cost much (for instance ROITTO 1969, p. 45–46 and 1970 p. 67–68) and the need for them was already expressed in 1963 (ROITTO 1963, p. 43).

It is not the purpose of this paper to try to analyse why the statistics have not been published. The main reasons may be simply bureaucracy and indifference. — The purpose of this paper is to publish the data for 1975.

2. METHOD

According to Finnish law each merchant ship has to be inspected annually for seaworthiness before its navigational season starts. In this connection, various data are recorded in questionnaires (for example ROITTO 1963, p. 77-80). The questionnaires have been changed but not brought up-to-date.

The questionnaires have been easily obtainable from the navigation inspectors when they were informed for what purpose they are to be used.

The method followed in this paper is the same as in the earlier ones (ROITTO 1963, 1969 and 1970). Since those were in Finnish, a short presentation here may be worthwhile.

The definition of 'a merchant ship' comprises all vessels used for business or for 'earning purposes'. Basically, the same inspection procedure for the seaworthiness of vessels is carried out in the case of a passenger boat taking hundreds of persons, a tug of 440 kW or a warping boat of 3 kW, manned by one person and operating on a very small lake. Besides safety factors and differences in interpreting by-laws, inspectors' fees may also play a role. — In this paper, vessels with less power than 37 kW (50 H.P.) are also included (contrary to usage in the ECE statistics, see Annual . . . , p. 164). They can easily be excluded if comparisons (on the basis of the UN/ECE statistics) are being made between countries.

Here, 'inland vessels' means those which navigate on lakes, rivers and at river mouths close to the sea. Basically, this definition agrees with that of inland waterways given by the ECE working party (Annual . . . , p. 164). In the case of Finland, however, there are two exceptions which do not — at least yet — make much difference. First: where is the limit between the sea and a river mouth? Even if it were easy to determine, it definitely cannot be a strict operative limit for a boat. The possible discrepancy due to this fact cannot be great (ROITTO 1963, p. 10). The second exception may, in the future, cause more discrepancies and call for special attention. In 1968, the Saimaa water system¹⁾ was re-linked with the

¹⁾ Also referred to as the Vuoksi water system.

sea. This caused, and may cause, in recording the inland waterway fleet the following problems:

- A vessel (often a tug) inspected for seaworthiness on the coast may operate on the Saimaa system and is thus excluded from the inland fleet when the same method as now is used.
- A vessel (also often a tug) for coastal and sea traffic, built at a Saimaa shipyard, is inspected in the Saimaa region but navigates on Saimaa only when on its way to the sea and is thus included in the inland fleet.
- A vessel may navigate on both, the sea and the lake. — For the purposes of this paper, a vessel is defined as belonging to the inland or non-inland fleet, depending on where it was inspected for seaworthiness. However, if a vessel is inspected for the sea in the Saimaa region, it is usually mentioned. It may, however, have been inspected for Saimaa somewhere on the coast and is, therefore, excluded from these statistics.
- In the future, new ship constructions may make it difficult to see whether a vessel belongs to the inland or the sea fleet.

For 1975, the above cases do not bias the statistics since the traffic through the Saimaa Canal is still rather insignificant.¹⁾ The ships which come to Saimaa to bring products to Finland, or to load Finnish products for foreign destinations, are not usually classified as inland vessels. Many of them even sail under a foreign flag.

The barges which, in the mid-1970s, transport mainly material for bundling roundwood for towing or sunken wood, are not inspected for seaworthiness. These barges are normally unmanned.

Here the same ownership grouping — with few changes — is used as shown in the 1963 paper (for the 1955 fleet). It may be changed for possible further inventories. For instance, timber companies and private entrepreneurs were grouped together earlier, because many private entrepreneurs were engaged in the wood business. Very often a private person may operate under his

¹⁾ For defining the inland waterway fleet.

own name and a smaller operation is carried out under the name of a joint-stock company or the like. It would also be practical in the future to divide the group 'other' into several 'others' including cities, hospitals¹⁾, etc., which seem to own more and more inland craft.

However, here as earlier, real mistakes were found in the questionnaires. For instance, the building year for a tug was put down as 1966, when it should have been 1911. The type of vessel was wrongly indicated and one inspector knew only one vessel type: freighter. The formulation of the questionnaire contributed to this latter error. All these discrepancies were corrected

as far as possible, but when correcting mistakes concerning the building year of a ship for instance, one has to know the ships — and remember them — before deciding whether it is worthwhile checking the data regarding a given vessel.

Nowadays, some multipurpose ships have been inspected for seaworthiness. They have been indicated in the questionnaires by, for instance, 'freighter/dredger' or 'passenger boat/tug'. These kinds of ships were included in the vessel-type groups of this paper according to the first indication, thus assuming that the first-mentioned term also referred to the more important characteristics or use of the vessel.

3. RESULTS

31. Overall picture

The overall picture is shown in the table below.

The Finnish inland waterway fleet, inspected for seaworthiness, in 1975.

Type of vessel	Water system						Total
	Vuoksi	Kymi-joki	Koke-mäenjoki	Oulu-joki	Kemi-joki	Others	
1 Tugs	205	87	20	41	122	20	495
2 Warping boats	28	14	3	—	5	21	71
3 Freighters	3	—	—	—	—	—	3
4 Barges	11	1	3	—	—	—	15
5 House barges	4	1	—	—	—	—	5
6 Passenger boats	67	19	16	3	5	8	118
7 Others	33	9	1	2	23	3	71
8 Total	351	131	43	46	155	52	778

In Finland, 778 vessels were inspected for traffic in 1975. Of these 495 were tugs, 118 passenger boats, 71 warping boats with the others totalling 94. The importance of

the Saimaa system is easily seen from these figures.

32. Review by vessel types

321. Tugs

¹⁾ In the case of each hospital a check was made as to whether it was run by the state or not (for dividing the vessels between state agencies and 'others').

The total tug power amounted to 32 349 kW (43 982 H. P.) and was 65 kW (89 H. P.)

per vessel in 1975. The biggest tug had a power of 441 kW (600 H.P.). The large number of small tugs, usually called motor boats, causes the average power per tug to be relatively small.

The average tug power and average age (in years) by water systems in 1975 was as follows:¹⁾

Water system	kW	(H.P.)	Age
Vuoksi	78	(106)	21
Kymijoki	55	(75)	21
Kokemäenjoki	71	(97)	17
Oulujoki	61	(84)	16
Kemijoki	53	(73)	17
Others	49	(68)	14
Average	65	(89)	19

¹⁾ There were only two steam tugs and these are included.

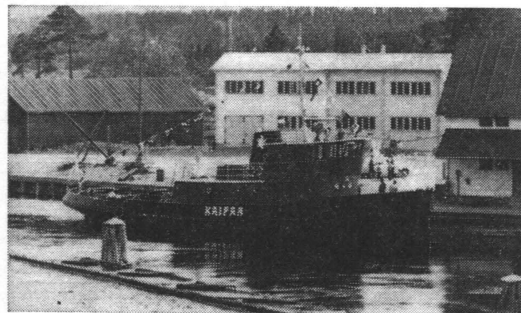


Fig. 1. The tug Kaipaa, built in France in 1947 and rebuilt in Finland in 1973. The hull is practically unchanged.

The age of a tug or any vessel is recorded here as the age of the original hull. Many tugs, originally steam-powered, have been converted to diesel and at the same time modernized. As the questionnaires very seldom showed the year when a vessel was rebuilt, a more systematic picture was obtained by applying the original building year. The age of the Finnish tugs was relatively high (an average of 19 years in 1975) and varied by water systems between 14 and 21 years.

The ownership distribution in 1975 was as follows:



Fig. 2. The wheel house of the tug Enso, built in Finland in 1971. Photo Matti Kaipiainen.

Ownership	Number of tugs
Large forest industry firms	198
Small forest industry firms	32
Floating associations	212
Timber companies and private entrepreneurs	23
State agencies	13
Others	17
Total	495

Altogether the tugs employed nearly 1000 persons (998), the average per tug being 2. Here, too, the large number of small tugs has its effect. The most powerful tugs had a crew of 6.

322. Warping boats

The total power of the 71 warping boats amounted to 1139 kW (1549 H.P.) and the average power per boat to 16 kW (22 H.P.). The average age (in years) by water systems in 1975 was as follows:

Water system	Age
Vuoksi	15
Kymijoki	23
Kokemäenjoki	14
Oulujoki
Kemijoki	16
Others	21
Average	18

The ownership distribution in 1975 was as follows:

Ownership	Number of warping boats
Large forest industry firms	29
Small forest industry firms	4
Floating associations	38
Total	71

Warping boats employed 97 persons in 1975.

323. Other vessels

The number of barges totalled 20, of which 15 were in the Vuoksi water system, 2 in the Kymijoki system and 3 in the Kokemäenjoki system. Of these, 15 were for transporting goods and 5 for lodging purposes. The average age of all barges in 1975 was 22 years. Of the 15 barges for transporting goods, 5 were owned by large forest industry firms, 4 by state agencies, 2 by timber companies and private entrepreneurs, and the remaining 4 by others.

There were hardly any inland freighters. Other vessels, which have not yet been

mentioned included dredgers, pontoons, fire-fighting boats, pleasure boats, etc.

Owing to the inspection procedure, the number of passenger boats — 118 in 1975 — also includes very small vessels. The biggest passenger boat navigating on Lake Iso-Saimaa in 1975 had 1324 kW (1800 H.P.) and a crew of 21, while the smallest 'passenger boat', inspected as such, had a power of 4,4 kW (6 H.P.) and a crew of 1 person.



Fig. 3. A house barge being moved by truck from one part of the water system to another.



Fig. 4. The group 'others' includes vessels of different types. — This picture shows a so-called boomboat, designed in Canada and built in Finland.

4. DISCUSSION

The Finnish inland waterway fleet, inspected for seaworthiness in 1975, was analysed in this paper. — The appended tables give a more detailed picture.

No comparison was made with earlier results (ROITTO 1963, 1969 and 1970) from 1955, 1967 and 1969. As the same method was used, the results are comparable in broad terms and also provide a basis for forecasting. There may be differences in the

inspection procedures between 1955 and 1975 (as to the inclusion of the smallest vessels and so on) and it is therefore difficult to appraise which apparent changes are real and which are only statistical.

Again, the wish may be expressed that some of the official agencies should, sooner or later, assume responsibility for publishing annual statistics on the inland waterway fleet in Finland.

REFERENCES

- Annual bulletin of transport statistics for Europe. Bulletin annuel de statistiques de transports pour l'Europe. Ежегодный бюллетень Европейской статистика транспорта Vol. XXIV — Том XXIV 1972. United Nations. Nations Unies. организация объединенных наций. 1973.
- Kotimaan vesiteiden henkilöliikennemäärät ja -suoritteet vuosina 1971—75. 1976. Vesiliikennetaloudellisia selvityksiä. 21. 10. 1976/SS-J A 19 C 145. Tie- ja vesirakennushallitus. Vesitieosasto. Mimeographed paper.
- ROITTO, YRjö. 1963. Suomen sisävesien aluskanta. Puutavaraliikenteen aluksia koskeva selvitys. Summary: Finnish Inland Waterway Fleet. An analysis with special reference to wood transporting vessels. Silva Fennica 113. Reprint.
- » — 1969. Suomen sisävesien aluskanta v. 1967 ja muutokset v:sta 1955. Puutavarali-

- kenteen aluksia koskeva selvitys. Summary: Finnish Inland Fleet In 1967 And Its Changes Since 1955. An analysis with special reference to wood transporting vessels. Suomen Uittajainyhdistyksen vuosikirja XXXVII. Reprint.
- » — 1970. Suomen sisävesien aluskanta v. 1969 ja kehitystrendit. Puutavaraliikenteen aluksia koskeva selvitys. Summary: Finnish Inland Waterway Fleet In 1969 And Its Development Trends. An analysis with special reference to wood transporting vessels. Résumé: La batellerie finlandaise en 1969 et les tendances de son développement. Une analyse avec référence spéciale aux bâtiments transportant le bois. Suomen Uittajainyhdistyksen vuosikirja XXXVIII. Reprint.
- TUOVINEN, ARNO. 1976. Metsäteollisuuden raaka-puun kaukokuljetukset vuonna 1975. Metsäteho. Seloste 13. Mimeographed paper.

RESUME:

LA BATELLERIE FINLANDAISE POUR VOIES NAVIGABLES INTERIEURES EN 1975, AVEC REFERENCE SPECIALE AUX BATIMENTS TRANSPORTANT LE BOIS

L'état de la batellerie finlandaise pour voies navigables intérieures a fait l'objet d'analyses en 1955, 1967 et 1969 (Roitto 1963, 1969, 1970).

Le présent document traite de la flotte intérieure inspectée en Finlande en 1975 à des fins de navigabilité. Cette flotte comprenait 778 bâtiments, sur lesquels on comptait 495 remorqueurs, 71 toueurs, 118 bateaux de passagers et autres dont 15 péniches. — Il n'y a pas de transports avec pousseurs en Finlande.

Les détails sont indiqués dans les chiffres du texte et dans les tableaux des appendices.

On peut regretter que même en 1975 il n'y ait pas encore de statistiques officielles sur la flotte intérieure finlandaise, alors que chaque année on recueille des données au moment où l'on vérifie la navigabilité des bâtiments. Des données officielles seraient extrêmement utiles à des fins nationales aussi bien qu'internationales.

SELOSTE:

SUOMEN SISÄVESIEN ALUSKANTA 1975. PUUNKULJETUSALUKSIA KOSKEVA SELVITYS

Tässä työssä on analysoitu Suomen sisävesien aluskanta v. 1975. Merikelpoisuuden takia katsastettuja aluksia oli silloin 778.

Yksityiskohtaiset tulokset näkyvät tekstiosan taulukosta ja asetelmista sekä liitetaulukoista 1...21.

Menetelmä on sama kuin aikaisemmissa selvityksissä (Roitto 1963, 1969 ja 1970). — Metsä-

teollisuusyritysten omistusjakoon on tullut pieniä muutoksia, mutta niillä ei tulosten kannalta ole merkitystä.

Tietojen tarve on ilmeinen, koska v:n 1969 työn tuloksia käytettiin vielä 1976 — parempien puutussa — ja koska ko. eripainos on ollut lopussa kauan sitten.

TABLES

Table 1. Tugs inspected for seaworthiness by H.P. class on the Finnish water systems in 1975

H.P.	Vuoksi	Kymi-joki	Kokemäen-joki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 0—49	62	45	3	12	69	5	196
2 50—99	66	17 ¹⁾	9	10	26	11	139
3 100—149	27	13	5	17	12	4	78
4 150—199	21	4	—	—	7	—	32
5 200—249	14 ¹⁾	7	3	2	2	—	28
6 250—299	2	1	—	—	—	—	3
7 300—349	5	—	—	—	6	—	11
8 350—399	1	—	—	—	—	—	1
9 400—449	3	—	—	—	—	—	3
10 450—499	—	—	—	—	—	—	—
11 500—549	2	—	—	—	—	—	2
12 550—599	1	—	—	—	—	—	1
13 600—649	1	—	—	—	—	—	1
14 Total	205	87	20	41	122	20	495

¹⁾ Including 1 steamer.

Table 2. Tugs inspected for seaworthiness by kW class on the Finnish water systems in 1975

kW	Vuoksi		Kymi-joki		Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total
	1	2	3	4	5	6	7	7	
1 0-49	97	54	6	17	81	14	269		
2 50-99	57	18 ¹⁾	11	22	26	6	140		
3 100-149	25	10	2	—	8	—	45		
4 150-199	11 ¹⁾	4	1	2	1	—	19		
5 200-249	7	1	—	—	6	—	14		
6 250-299	4	—	—	—	—	—	4		
7 300-349	—	—	—	—	—	—	—		
8 350-399	2	—	—	—	—	—	2		
9 400-449	2	—	—	—	—	—	2		
10 Total	205	87	20	41	122	20	495		

¹⁾ Including 1 steamer.

Table 3. H.P. distribution of tugs inspected for seaworthiness on the Finnish water systems in 1975

H.P.	Vuoksi		Kymi-joki		Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total		
	s/s	m/s	s/s	m/s	m/s	m/s	m/s	m/s	s/s	m/s	s/s+m/s
I	1	2	3	4	5	6	7	8	9	10	11
1 0-49	—	1605	—	1303	111	250	2155	146	—	5570	5570
2 50-99	—	4596	87	1101	603	705	1904	722	87	9631	9718
3 100-149	—	3204	—	1633	598	2055	1420	491	—	9401	9401
4 150-199	—	3387	—	661	—	—	1122	—	—	5170	5170
5 200-249	216	2896	—	1500	630	440	410	—	216	5876	6092
6 250-299	—	570	—	280	—	—	—	—	—	850	850
7 300-349	—	1586	—	—	—	—	1860	—	—	3446	3446
8 350-399	—	350	—	—	—	—	—	—	—	350	350
9 400-449	—	1205	—	—	—	—	—	—	—	1205	1205
10 450-499	—	—	—	—	—	—	—	—	—	—	—
11 500-549	—	1000	—	—	—	—	—	—	—	1000	1000
12 550-599	—	580	—	—	—	—	—	—	—	580	580
13 600-649	—	600	—	—	—	—	—	—	—	600	600
14 Total	216	21579	87	6478	1942	3450	8871	1359	303	43679	43982

Table 4. kW distribution of tugs inspected for seaworthiness on the Finnish water systems in 1975

kW	Vuoksi		Kymijoki		Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total		
	s/s	m/s	s/s	m/s	m/s	m/s	m/s	m/s	s/s	m/s	s/s+m/s
I	1	2	3	4	5	6	7	8	9	10	11
1 0-49	—	2699	—	1342	201	393	2078	503	—	7216	7216
2 50-99	—	4077	64	1304	761	1818	1938	497	64	10395	10459
3 100-149	—	3044	—	1244	296	—	977	—	—	5561	5561
4 150-199	159	1697	—	668	170	326	155	—	159	3016	3175
5 200-249	—	1593	—	207	—	—	1377	—	—	3177	3177
6 250-299	—	1149	—	—	—	—	—	—	—	1149	1149
7 300-349	—	—	—	—	—	—	—	—	—	—	—
8 350-399	—	739	—	—	—	—	—	—	—	739	739
9 400-449	—	873	—	—	—	—	—	—	—	873	873
10 Total	159	15871	64	4765	1428	2537	6525	1000	223	32126	32349

Note: In the original data processed there was a difference of 1,5 per cent with the total figure of H.P. converted to the total of kW by 0,7355. This discrepancy was corrected by adding the corresponding percentages to the processed figures by water systems.

Table 5. Average age (in years) and number of crew of tugs inspected for seaworthiness by H.P. class on the Finnish inland waterways in 1975

H.P.	Number of vessels	Age	Crew	
			Total	Per vessel
I	1	2	3	4
1 0-49	196	19	286	1
2 50-99	139	16	222	2
3 100-149	78	16	182	2
4 150-199	32	25	99	3
5 200-249	28	24	101	3
6 250-299	3	48	16	5
7 300-349	11	28	47	4
8 350-399	1	75	5	5
9 400-449	3	21	16	5
10 450-499	—	—	—	—
11 500-549	2	30	12	6
12 550-599	1	66	6	6
13 600-649	1	4	6	6
14 Total and average	495	19	998	2

Table 6. Average age (in years) and number of crew of tugs inspected for seaworthiness by kW class on the Finnish inland waterways in 1975

kW	Number of vessels	Age	Crew	
			Total	Per vessel
I	1	2	3	4
1 0-49	269	18	395	1
2 50-99	140	16	279	2
3 100-149	45	21	144	3
4 150-199	19	32	72	4
5 200-249	14	32	63	5
6 250-299	4	35	21	5
7 300-349	—	—	—	—
8 350-399	2	30	12	6
9 400-449	2	35	12	6
10 Total and average	495	19	998	2

Table 8. H.P. classes of tugs inspected for seaworthiness on the Vuoksi water system by ownership in 1975

H.P.	Large forest industry firms	Small forest industry firms	Floating associations	Timber companies and private entrepreneurs	State agencies	Others	Total
I	1	2	3	4	5	6	7
1 0-49	46	5	5	4	2	—	62
2 50-99	46	5	8	4	3	—	66
3 100-149	8	—	14	1	3	1	27
4 150-199	13	—	7	—	1	—	21
5 200-249	5 ¹⁾	—	9	—	—	—	14
6 250-299	2	—	—	—	—	—	2
7 300-349	4	—	1	—	—	—	5
8 350-399	1	—	—	—	—	—	1
9 400-449	2	—	1	—	—	—	3
10 450-499	—	—	—	—	—	—	—
11 500-549	2	—	—	—	—	—	2
12 550-599	1	—	—	—	—	—	1
13 600-649	1	—	—	—	—	—	1
14 Total	131	10	45	9	9	1	205

¹⁾ Including 1 steamer.

Table 7. Tugs inspected for seaworthiness by ownership on the Finnish water systems in 1975

Ownership	Vuoksi	Kymi-joki	Kokemäenjoki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 Large forest industry firms	131 ¹⁾	34	10	6	16	1	198
2 Small forest industry firms	10	15 ¹⁾	7	—	—	—	32
3 Floating associations ...	45	29	—	29	95	14	212
4 Timber companies and private entrepreneurs ..	9	2	1	1	5	5	23
5 State agencies	9	2	—	—	2	—	13
6 Others	1	5	2	5	4	—	17
7 Total	205	87	20	41	122	20	495

¹⁾ Including 1 steamer.

Table 9. kW classes of tugs inspected for seaworthiness on the Vuoksi water system by ownership in 1975

kW	Large forest industry firms	Small forest industry firms	Floating associations	Timber companies and private entrepreneurs	State agencies	Others	Total
I	1	2	3	4	5	6	7
1 0-49	72	8	9	5	3	—	97
2 50-99	27	2	18	4	5	1	57
3 100-149	15	—	9	—	1	—	25
4 150-199	4	—	7	—	—	—	11
5 200-249	6	—	1	—	—	—	7
6 250-299	3	—	1	—	—	—	4
7 300-349	—	—	—	—	—	—	—
8 350-399	2	—	—	—	—	—	2
9 400-449	2	—	—	—	—	—	2
10 Total	131	10	45	9	9	1	205

Table 10. H.P. classes of tugs inspected for seaworthiness on the Kymijoki water system by ownership in 1975

H.P.	Large forest industry firms	Small forest industry firms	Floating associations	Timber companies and private entrepreneurs	State agencies	Others	Total
I	1	2	3	4	5	6	7
1 0-49	14	10	16	2	1	2	45
2 50-99	8	4 ¹⁾	3	—	1	1	17
3 100-149	7	—	6	—	—	—	13
4 150-199	2	—	1	—	—	1	4
5 200-249	3	1	2	—	—	1	7
6 250-299	—	—	1	—	—	—	1
7 Total	34	15	29	2	2	5	87

¹⁾ Including 1 steamer.

Table 11. kW classes of tugs inspected for seaworthiness on the Kymijoki water system by ownership in 1975

kW	Large forest industry firms	Small forest industry firms	Floating associations	Timber companies and private entrepreneurs	State agencies	Others	Total
I	1	2	3	4	5	6	7
1 0-49	19	11	18	2	2	2	54
2 50-99	10	3	4	—	—	1	18
3 100-149	5	—	4	—	—	1	10
4 150-199	—	1	2	—	—	1	4
5 200-249	—	—	1	—	—	—	1
6 Total	34	15	29	2	2	5	87

Table 12. Warping boats¹⁾ inspected for seaworthiness by H.P. class on the Finnish water systems in 1975

H.P.	Vuoksi	Kymi-joki	Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 0-49	26	14	3	—	5	15	63
2 50-99	1	—	—	—	—	5	6
3 100-149	—	—	—	—	—	1	1
4 150-199	1	—	—	—	—	—	1
5 Total	28	14	3	—	5	21	71

¹⁾ All motor-powered.

Table 13. Warping boats inspected for seaworthiness by kW class on the Finnish water systems in 1975

kW	Vuoksi	Kymi-joki	Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 0-49	27	14	3	—	5	19	68
2 50-99	—	—	—	—	—	2	2
3 100-149	1	—	—	—	—	—	1
4 Total	28	14	3	—	5	21	71

Table 14. H.P. distribution of warping boats inspected for seaworthiness on the Finnish water systems in 1975

H.P.	Vuoksi	Kymi-joki	Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 0-49	233	252	44	—	83	241	853
2 50-99	57	—	—	—	—	337	394
3 100-149	—	—	—	—	—	127	127
4 150-199	175	—	—	—	—	—	175
5 Total	465	252	44	—	83	705	1549

Table 15. kW distribution of warping boats inspected for seaworthiness on the Finnish water systems in 1975

kW	Vuoksi	Kymi-joki	Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 0-49	207	185	32	—	61	366	851
2 50-99	—	—	—	—	—	153	153
3 100-149	135	—	—	—	—	—	135
4 Total	342	185	32	—	61	519	1139

The same note as in Table 4 applies here, except that the difference was 3,5 per cent.

Table 16. The number of crew of warping boats inspected for seaworthiness by H.P. class on the Finnish inland waterways in 1975

H.P.	Number of vessels	Crew	
		Total	Per vessel
I	1	2	3
1 0-49	63	83	1
2 50-99	6	10	2
3 100-149	1	2	2
4 150-199	1	2	2
5 Total and average	71	97	1

Table 17. The number of crew of warping boats inspected for seaworthiness by kW class on the Finnish inland waterways in 1975

kW	Number of vessels	Crew	
		Total	Per vessel
I	1	2	3
1 0-49	68	91	1
2 50-99	2	4	2
3 100-149	1	2	2
4 Total and average	71	97	1

Table 18. Warping boats inspected for seaworthiness by ownership on the Finnish water systems in 1975

Ownership	Vuoksi	Kymi-joki	Koke-mäen-joki	Oulu-joki	Kemi-joki	Others	Total
I	1	2	3	4	5	6	7
1 Large forest industry firms	20	3	1	—	4	1	29
2 Small forest industry firms	2	—	2	—	—	—	4
3 Floating associations	6	11	—	—	1	20	38
4 Total	28	14	3	—	5	21	71

Table 19. H.P. classes of warping boats inspected for seaworthiness by ownership on the Finnish inland waterways in 1975

H.P.	Large forest industry firms	Small forest industry firms	Floating associations	Total
I	1	2	3	4
1 0-49	27	4	32	63
2 50-99	1	—	5	6
3 100-149	—	—	1	1
4 150-199	1	—	—	1
5 Total	29	4	38	71

Table 20. kW classes of warping boats inspected for seaworthiness by ownership on the Finnish inland waterways in 1975

kW	Large forest industry firms	Small forest industry firms	Floating associations	Total
I	1	2	3	4
1 0-49	28	4	36	68
2 50-99	—	—	2	2
3 100-149	1	—	—	1
4 Total	29	4	38	71

Table 21. Barges¹⁾ inspected for seaworthiness by volume on the Finnish water systems in 1975

net reg. ton ²⁾	Vuoksi	Kymi-joki	Koke-mäen-joki	Total
I	1	2	3	4
1 90-99	—	—	1	1
2 100-109	—	—	—	—
3 110-119	—	—	—	—
4 120-129	—	—	—	—
5 130-139	—	—	—	—
6 140-149	1	—	—	1
7 150-	1	—	2	3
8 Not known	9	1	—	10
9 Total	11	1	3	15

¹⁾ For transporting goods.

²⁾ Reg. ton = 2,83 m³