ICOMIA

INTERNATIONAL COUNCIL OF MARINE INDUSTRY ASSOCIATIONS

DECOMMISSIONING OF END-OF-LIFE BOATS

A Status Report

2nd Edition

December 2007

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ON DECOMMISSIONING OF END-OF LIFE BOATS

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I. Rationale:

Since fibre reinforced polymers (FRP) became available for commercial application in the 1950s, the market for and the production of recreational craft constructed from FRP have grown at an impressive rate.

Although statistics are far from complete, it is estimated that within the EU only, there are about 6.0 million recreational craft and that some 32 million people participate in leisure boating per annum. The market continues to expand, and within the EU an average growth rate of between 5% and 6% is to be anticipated in the years to come.
In the USA the estimated number of recreational craft is some 16,4 million, and the Australian figure is about 750.000. If the common ratio of user to boats is the same in Australia and the US as in Europe, the number of people participating in boating in these areas probably exceeds 125 million.

Although a number of vessels are constructed from traditional materials like metal and wood, FRP has been totally dominant in the mass market during the last decades.

Recreational craft do not last for ever. However, much dependent on size, type and usage, vessels constructed from FRP may last for 50 years or more. During their lives boats may change owners several times, and it is not unusual that boat owners want to dispose of smaller boats simply because of changing interest, habits and family situation.

Nevertheless, even when properly maintained, materials and equipment tend to deteriorate with use and exposure to the marine environment. Even the best constructed craft will some day have to end its life.

II. Recent history:

Already in 1988 the Norwegian Marine Federation arranged a press seminar focussing on the issue of end-of life boats: "For how long will they last and what about decommissioning?"

In 1993 the same questions were raised by the authorities and a comprehensive study was carried out financed by governmental funding. It soon became evident that as far as recovery of materials and/or energy from FRP laminates are concerned, for economical reasons it is necessary to maximise the volume for treatment by collecting FRP waste from any possible source, whether originating from industries related to agriculture, transport, water supply/sanitary, offshore or - indeed - the boating industry [Re. Annex A].

Since 2000 similar studies have been undertaken in Japan by the Ministry of Land, Infrastructure and Transport (MLIT) together with the Japan Boating Industry Association (JBIA). Presentations of "Recycling System for Disused FRP Boats" have been given at ICOMIA Congresses (including the Congress 2006). In cooperation with the Japanese cement industry the FRP recycling system will, according to plans, be established across the county by the end of 2007. In their presentation the JBIA referred to cost figures representative for their recycling system as follows: Boats of Lh 4,0 m: ¥ 31,000 ¥ 45,000 for boats of Lh 4,0 to 6,0 m. and ¥ 65,000 for boats of Lh 6,0 to 7,0 metres. These figures compare favourably with the cost of conventional disposal of some ¥ 200,000[1] per unit. [Re. Annex B].

In France, FIN last year finished their comprehensive study on "The ELB Network in France" referring to the "Extended Producer Responsibility" (EPR). The French study concluded that the total mean cost of decommissioning including collecting logistics, dismantling and disposal of remaining waste would give the following numbers: Boats of Lh = 4.00 metres: € 530.00, boats of Lh = 6.00 metres: € 1,202 and boats of Lh=12.00 metres: € 4,750 [Re. Annex C].

As the project became integrated in the ECNI structure, and following a visit to the Finnish waste managing company Messrs Kuusakoski initiated by Finnboat who has set an important example in its pioneering work on ELB disposal (see below), ECNI finished their report on "End of life boat disposal in Finland" by October 2007.

Finland in the same period of time completed their report on the Finnish Boat Recycling Project. In cooperation with a leading industrial recycling company in Northern Europe and utilizing the infrastructure and shredder machines of Kuusakoski Group OY, the Finnish project is reporting the following cost figures:

For boats under 6,00 metres: € 10.00 per metre boat length. For boats over 6.00 metres Lh, the cost would be € 150.00 per tonnes boat weight. These figures do not include transport services/logistics which would account for approximately € 70.00 per hour. [Re. Annex D].

In the USA there is at present no active legislation or existing regulation that require treatment of ELBs. However, there are regulations for proper disposal of chemicals such as lead, mercury, waste oil etc. which might be found on the boat, but without focussing on the boat as such. The cost of leaving the boat with the scrap dealer is basically the cost of hauling trash. The scrap dealer can then salvage what is worth while of scrap metal and parts and then pay the tipping fee at the landfill for disposal of the hull and deck.

In Australia ELBs so far seem to be of little concern.

At the ICOMIA/IFBSO Congress Joint Day Programme 1st. June 2001 the undersigned was given the opportunity to make a presentation on the theme "Disposal of end-of life boats". In the closing remarks the industry was recommended to prepare for future unavoidable legislation with reference to Extended Producer Responsibility (EPR). By being proactive the industry might avoid politicians and bureaucrats taking command.

[1] Exchange rate ¥ to € ≈ 0.0064

Generally speaking, disposal of ELBs by landfill is becoming more restrictive in many countries. Smaller and simple boats may still be accepted, but in many countries bigger and heavily equipped vessels will most probably have to be taken care of by authorised scrap dealers. As legislation is becoming stricter, landfill will gradually become an alternative of the past.

The Seventh Frame Work Programme (FP7) of the European Economic Area (EEA) which will run from 2007 through to 2013, has end-of life boat disposal is one of the numerous items on the agenda. The European boat industry is invited to participate in projects focussing on how to meet the challenge of the increasing number of craft requiring disposal.

III. The present situation:

As far as decommissioning is concerned, there are of course huge differences from one craft to another both with regard to pure size (dimensions and weight), materials (hull, deck, superstructure, equipment, interiors) and the way by which they are put together (eg. wood: traditional, strip, cold moulded, sheathed etc.), as well as to furniture, engines, propulsion systems, electrical installations, electronic systems etc. However, although technicalities are not insurmountably complicated processes may be time consuming.

The total operation of decommissioning must however be planned to minimize possible negative environmental impacts from for instance transport and handling, from energy consuming processes, from pollution (gases, dust, generation of noise) and the like. (Example: With reference to the problem of dust generated in the FRP shredding process, the Japanese industry has successfully demonstrated that this may be remedied by adding waste oil when treating the material. The waste oil is binding the dust and thus helps keeping the air clean.) Systematic assessment of the Best Available Techniques (BAT) should be carried out for typical cases and operations.

It is recommended that the boat industry establishes close cooperation with major waste managing companies who have already set up systems for collecting and treating of end-of life objects comparable to ELBs. The boat industry may position itself to benefit from involvement in some of the relevant processes, for instance with regard to the reuse stage.

Transport, infrastructure and logistics:

From studies which have been carried out around the world, we know a lot about how ELBs may be disposed of in environmentally friendly ways after being brought to the decommissioning shop.

However, as ELBs may be located at remote places far from decommissioning plants, environmentally friendly collection and transport of ELBs may be a key issue.

Proper assessments of the environmental impact of transport and handling should be carried out and systems optimised based on Best Available Techniques. Establishing local/regional terminals at which initial dismantling of components as well as compacting of hulls, decks and superstructure may take place prior to shredding and transport to the factory for final recovery of materials and energy, has to be considered while keeping the waste hierarchy in mind: Reuse → Recycling of materials → Recovery of energy → Disposal.

To optimise logistics it is vital to keep the over all cost down. As ELBs may be left behind at remote places difficult to access by truck and even by a freighter ship, alternative ways of collecting ELBs (e.g. by specially equipped barges) must be looked into.

Experience indicates some typical challenges to be considered:

i. *Unidentifiable ELB-owners:*
Occasionally ELBs are left behind after identification numbers have been removed and the craft carefully made anonymous. ELBs are typically being dumped at sea or left behind at the waterfront, on beaches or in marinas.
Occasionally boats may have changed ownership several times since new, and even if an old ID number may be uncovered, it may still be impossible to trace the responsible person(s).

ii. *Owners who may be identified and found, but being unwilling - or unable - to pay the bills:*
Identified owners of abandoned boats may be unwilling to pay for removal and decommissioning of the craft. It may be a lengthy process to bring boats to the scrap dealer for the necessary treatment. Enforcing the "polluter pays" principle may be costly.

iii. *The conscientious boat owners:*
These owners of ELBs bring their boats to the decommission shop or scrap dealer, paying the bills for transport and decommissioning. However the price to pay may be considerable and owners may be hesitant.

The waste hierarchy:

The waste hierarchy is referring to the following five levels:

1) *Waste minimization*
2) *Reuse*
3) *Recycling (recovery of materials)*
4) *Recovery of energy from waste* and
5) *Disposal by landfill* (to be minimized - increasingly stricter legislation)

With reference to the waste hierarchy levels:

Level 1) *Waste minimization:*
Waste minimization is to be carefully considered when planning new products i.e. at the stages of design, development and construction. Consequently, in the context of ELBs there is normally little which can be positively done to minimize waste the origin of which refers to the conception of the product. When the craft has reached the stage of ELB, the waste is already present;

Level 2) *Reuse:*
Extending products' life is probably one of the best ways to demonstrate environmental care. However, repairing and refurbishing a complete boat may in itself be polluting, it may demand a lot of energy, and new materials may be employed in a relatively short-lived project. On the other hand a number of components fitted on or in a boat, may have been scarcely used during the vessel's life and consequently be attractive on the second hand equipment and accessories market. When a boat owner decides to deliver his craft for decommissioning, any possibility of reuse should be considered. Reuse may be the best way of adding value to the decommissioning process;

Level 3) *Recycling a. (recovery of materials):*
The processes of recycling metals are familiar. (Aluminium is extremely environment friendly in this respect, in that only about 4% to 6% of the energy needed for making virgin aluminium from bauxite is consumed when making "new" aluminium from scrap.) Most thermoplastics may be recycled, although some degeneration of the recycled material may be experienced (ageing). Wood may be less attractive for materials recovery after having been treated with chemicals against rot.
Waste FRP is normally regarded difficult to handle. However, the following applications of scrap FRP look promising:

- Pure materials recovery by grinding cured laminate into "recyclate" gives new materials with new properties which add value to virgin or old laminates in a variety of applications when mixed with resins;
- Alternatively, recyclate has been successfully added to asphalt to improve performance;

Level 4) *Recycling b. (recovery of energy):*
Energy recovery by incineration must be carried out with due attention being paid to emission restrictions and national / regional legislation. For instance incineration of impregnated wood may be against rules and regulations unless undertaken by authorised operators;

Combination of Levels 3) and 4) *Combined materials recovery and energy recovery: The cement track:*
In a combination of materials recovery (Recycling a) and energy recovery (Recucling b), FRP has been successfully used in the manufacture of cement in a combination of both energy recovery (kiln temperature in the range of 1350°C to 1500°C) and supply of additives from the ashes (mainly SiO_2, CaO, Al_2O_3 which are important ingredients in the process). Typical figures are for 30% energy recovery and 70% materials recovery, which means 100% useful application. It is, however, evident that this way of recycling can only be successful when there is a supply of, and an infrastructure in place to collect, process and distribute, the necessary volume of ground FRP waste to preset specifications;

Level 5) *Disposal by landfill:*
As already mentioned in section II, disposal by landfill will probably be more restricted in the years to come and the boat industry should refrain from considering landfill as an acceptable alternative;

IV. The likely future industry responsibilities:

There are reasons to expect that the principle of Extended Producer Responsibility (EPR) will have impact on future legislation. EPR entails that the primary producer or manufacturer is deemed responsible for the product right through to its end-of life. This placing of responsibility addresses what the OECD recognizes the weakest link in the product responsibility chain, namely the final disposal of products after their sale and use by consumers. Typically EPR may involve product take-back as well as design for disassembly.

Establishing environmental awareness is a major issue for ICOMIA. With reference to EPR the boat industry must be alert to the general direction of environmental regulation and consumer pressure which is focussing more and more on the environmental impact of products through their entire life-cycle. Introducing Life-Cycle Assessment (LCA) is promoting environmental awareness. Disposal is the last stage of the product life-cycle.

V. Funding:

Establishing systems for funding of decommissioning and logistics may become a major challenge.

When owners of abandoned ELBs cannot be traced or identified, the ELBs may be classified "historic waste". Historic waste is a consequence of no system having been established to prepare for what may happen to boats upon reaching their end of life. A relevant question is who is going to pay for the cleaning up of beaches, hinterland and indeed the seabed where dumped boats have come to rest. This problem is presumed to be the authorities' responsibility in that they have not - in time - encouraged the economic operators, i.e. the boat industry, to establish feasible systems to avoid the situation.

Boats that are presently in use, will - in due time - end up as their owners' problem until the principle of EPR has become legislation. The economic consequences may be extensive, as the cost of treatment may be escalating.

However, the EPR takes it for granted that the responsible "economic operators" are living longer than the boats they are producing or servicing. This is not always the case, and it is not unusual that boat

manufacturers and boat importers are ending *their* lives prior to the products for which they should take responsibility in the end.

This critical issue was extensively considered as part of the project summarized in Annex 1. It became obvious that ideally the economic operators should be relieved from responsibility for their products long before same products end *their* lives. As a consequence a major insurance company was approached to evaluate the feasibility of establishing a system by which same company took on total responsibility for the vessel prior to decommissioning.

In principle a premium is paid into a fund on the day when the craft is put into service. The insurance company is in charge of administering the fund and ensures there is always money available to cover the cost of decommissioning of the ELB. It is presumed that the insurance company will require that the craft in question be officially registered.

The system of recycling insurance will also suppose proper solutions be established with regard to boats changing nationality.

Annex E gives a brief introduction to the "Recycling Insurance" system as established by the Swedish company Länsförsäkringar to cover the economic responsibility of economic operators under the principle of EPR.

There may be different solutions to the financing and funding challenge, but the "Recycling Insurance" described is *one* alternative of solving an obvious challenge.

VI. Conclusion and recommendation:

One of the objectives of the ICOMIA Sustainable Boating Strategy is to establish 'environmental care' as a core value of the recreational boating industry.

There are at present only very few abandoned boats in public spaces or marinas. They are not hazardous and pose only a poor visible impression on the public. However we must acknowledge that there is large "legacy" fleet from the 1960s until today which will in due time require end of life disposal. Boats built over the past 15 years are not so heavily constructed as their predecessors but are more resistant to deteriorating from issues as osmosis. Therefore it is almost impossible to forecast when end-of-life boat disposal will become such an issue that it requires intervention by industry itself. What is evident from other industries is that in due course our industry will have to play some role in their disposal or in their suitability for disposal through design. However, at this stage ICOMIA does not see a direct role for our industry in the disposal of end- of-life boats.

Present knowledge has caused the ICOMIA Executive Committee to decide upon the following courses of action:

- MIAs should ensure that viable options for decommissioning of End-of-Life Boats exist in their countries. .
- MIAs establish liaison with national and local authorities to address any emerging problems
- End of life boats must be regarded as a recycling item and the emotional link to the boat needs to be broken in discussing its ultimate means of disposal
- Final disposal of ELBs should be left to existing commercial providers such as Kuusakoski in Finland. By going into partnership with well established commercial companies, ultimate disposal of the various materials found in a boat becomes easier, as such partners are experts in consolidating waste into commercially viable volumes. Such operators are developing standardised and optimised large-scale processes for handling End-of Life products in an environmental friendly way, minimising costs and negative environmental impact while maximising added value.

Annexes:

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The following Annexes summarise the outcome of the four projects briefly mentioned in Section II (A to D), explaining the principle of recycling insurance (E) and considering the collaboration between FRP industries in Europe (F).

A. The NORBOAT project 1994

As a first step the project met with the cement factory NORCEM to look into the possibilities of energy recovery. The conclusions were positive, except for cost considerations. In one of their kilns the manufacturer has to add chlorine to the process to give the end product the properties asked for. Core material made from expanded PolyVinyl Chloride (PVC) is widely used in sandwich laminates based on PVC-foam. Consequently PVC-foam might be accepted for the process. However the "cement-track" was at that time regarded the lowest priority alternative, in that more high-value recirculates were aimed at.

A group of young people known as the "EcoPilots" assisted in searching for left-behind ELBs in a very limited area of the coastline near the town of Fredrikstad. No less than 67 boats were found, reported, and photographed. However only five of the 67 craft had signs of register plates on them, three of which were no longer on the authority's list. It was not possible to identify the responsible owner of any of the 67 boats, 76% of which were less than 4,5 metres Lh. Seven of the 67 boats were brought to a decommissioning plant. The boats were made of FRP, polyethylene and wood and treated accordingly.
Ground FRP mixed with polyester resin was tested as core material of the skin of an outboard boat of Swedish origin with encouraging outcome.

With reference to 6.d below a major insurance company was approached. Discussions led to constructive conclusions with regard to the concept named "Recycling Insurance" (re. Annex E).

The following conclusions were drawn:

1. Action should be taken to avoid future problems
2.a Statistical data not available to provide necessary numbers for obtaining a general view
2.b No system in existence to provide proper data for and facilitate planning of disposal
2.c Difficult to identify owners of left behind ELBs
2.d Left behind ELBs often difficult to access for collection
2.e There is obviously extensive illegal dumping which must be avoided
2.f Collection, transport and treatment are costly and feasible financing must be established
3. All kinds of construction materials are to be considered

4. To avoid boat owners shirking their disposal responsibilities, the need for a mandatory central boat register is obvious
5. Focussing on re-use and refurbishing may create new business opportunities
6.a Financing of future ELB disposal by establishing of tailored funds
6.b Initially the cost of treating unidentified ELBs to be covered by governmental grants
6.c Solutions to be found to finance treatment of ELBs until funding system is established
6.d The structure of the industry makes some kind of insurance system a probable solution
7.a Logistics and structure of decommissioning plants to be assessed thoroughly
7.b Cooperation with already established waste treatment operations vital
7.c With regard to FRP-waste: The total FRP industry to cooperate (not only boat builders)
8. To succeed in establishing a proper system necessary legislation must be in place
9. How to progress establishing a national system.

A plan for the next steps was worked out, and the following issues were listed:

- How to minimise negative environmental impacts from the process (including transport and treatment)
- Economically optimised logistics
- Development of proper methodologies
- Assessment of market potentials for outlet products
- Development of products based on materials originating from ELBs
- Main project: Decommissioning of 2000 units of all relevant sizes and materials
- Assessment of optimum localization of terminals and plants
- Cooperation with the total FRP industry.

The project was brought to a halt because of lack of governmental support as the Department of Environment no longer regarded disposal of ELBs an urgent issue.

B. The JBIA project 2002-2006

At the ICOMIA Congress 2002 the Japan Boating Industry Association (JBIA) made their first presentation of a project undertaken by the JBIA, the Ministry of Land, Infrastructure and Transport (MLIT) and by the Japanese Maritime Research Institute. The main purpose of the project was twofold:

- to solve the potential environmental problems by the boats discarded at the waterfront, and
- to meet the public requirement for creating an environmentally friendly society.
  At the Congress 2006 the JBIA gave an update report on the successful development of their FRP recycling system describing and illustrating the phases

  1. Collection of Disused FRP Boats
  2. Breaking-up
  3. Separating (interiors, woods, rigging, metals etc.)
  4. Transport of FRP parts after separating
  5. Cutting and crushing
  6. Sorting (20 mm FRP-fragments from woods, foam materials etc.)
  7. Cement Production Process Rotary Kiln

  Based on experience gained, the purpose of the project has been slightly modified and expanded:

- To solve the potential environmental problems posed by *illegally abandoned and/or sunk FRP boats,*

- To meet the public requirements for creating a recycling oriented society and for effective use of resources, and
- To extend the FRP boats manufacturers' responsibility for their products to the post-consumer stage (EPR).

The Japanese recycling system will be managed by the JBIA who started the operation in limited areas with the intention to expand every year until the system is available to all parts of the country by 2007.

The net cost of disposal as described is appreciably lower that what is the cost of conventional disposal of ELBs in the country.

Choosing the "cement-track" has obviously been successful, and the collaboration between the boating industry and the cement industry has been very constructive indeed.

C. The FIN/ECNI project 2005-2007 (first report January 2006, 2nd report October 2007)

The French study refers to Regulatory requirements and "Extended Producer Responsibility", i.e. mechanisms by which responsibility is transferred from the holders of waste to its producers and takes into consideration that

a. The life cycle of a recreational boat is relatively long;
b. When boats are dismantled, there is little scope for economic recycling of the waste produced;
c. There is insufficient monitoring of the fleet;
d. The volume concerned is small (20,000 tonnes per year);
e. Recreational sailing is an "outdoor" activity.

When considering a dismantling process the industry is looking for (typically)

i. processes that are financially acceptable to boat owners who are to dispose of their craft;
ii. optimising of dismantling costs;
iii. decommissioning being established as a professional industry;
iv. adoption of a lasting approach.

The aims of the French study were to:

- Put forward a plan for the industrialised dismantling of sail and motorboats between 4 and 12 metres long;
- Determine the legal provisions that apply to recreational boats arriving at the end of their useful life;
- Identify and evaluate the costs and sources of financing;
- Draw up an organisational plan for directing the entire scheme.

The report, which is dated 30th January 2006, continues by looking closer into the logistics, the dismantling process, the management of the waste generated and establishes a breakdown of the costs of operating a

Central Plant with a balanced capacity. An average figure including collection logistics, dismantling and waste disposal ends up at an average figure of € 1,200 corresponding to a 6 metre craft (€ 530 for a 4 m craft and € 4,750 for a 12 m vessel).
The report considers how to establish an "ELB Network" and how to finance such network.

The report concludes as follows:

a) an industrialised dismantling process has been designed and tested;
b) the current and expected future legal provisions have been identified;

c) the costs of establishing the network and potential sources of financing have been identified and evaluated:

Estimated yearly (2006) operating costs of a single centre as an average figure corresponding to 1,500 craft each of	
Lh 6.00 metres:	
Collection logistics:	€ 450,000.-
Dismantling:	€ 1,233,000.-
Waste disposal:	€ 120,000.-
Total:	€ 1.803,000.-
indicating a mean figure per boat:	€ 1,202.-
The cost is of course dependent on boat size, and	
the mean figure per boat of Lh 4.00 metres is estimated to	€ 530.-
and the mean figure per boat of Lh 12.00 m. is estimated to:	€ 4,750.-

d) An organisational plan for directing the whole network has been suggested, based on the creation of an "eco-body" organisation.

The report finishes by summing up the risks of "going ahead" and "not going ahead".

The final report, which is carried out by ECNI and dated October 2007 given the title "End of life boats disposal in Finland", gives details on a project carried out by the Finnish Marine Industries Federation (Finnboat) and a visit by ECNI to the waste managing operator Kuusakoski mentioned in the following section (D). The report gives details on the disposal process employed such as loading scrap into the plant, the machinery, how sorted scrap goes to further processing, and a flow diagram of the large scale recycling plant.

D. **The FINNBOAT project 2005-2006:**

The report of the Finnish "Boat recycling project" dated 2006-11-03 states that "there are almost 750,000 recreational boats in Finland, about 3000 of which are decommissioned each year. Disposing of boats is currently the responsibility of the owner. Before year 2005 there was no reasonable way to recycle boats."

The system is based on the recycling company Kuusakoski's experience from decommissioning End-of-Life Vehicles. Messrs. Kuusakoski do recycle several hundreds of tons shreddable metal materials per year in Finland only. The size of operation influences favourably on the cost of logistics and shredding. The same "hammershredder" machine used for cars is used for ELBs. A "wind-separator" is separating wood, FRP and thermoplastics from metals, while different metals are separated utilizing magnets, "eddy-current" and sink-float separators. The shredder accepts components the size of a large automobile. So far waste FRP has been landfilled after shredding as until today no market has appeared accepting the relatively small quantity of approximately 10 tons of shredded FRP a year.

System testing:
During Summer 2005 Finnboat in cooperation with Messrs. Kuusakoski started a trial boat collection system in the Turku archipelago area.
The collection was carried out with a small cargoferry which sailed around the islands picking up boats. In harbours which could be reached by trucks, crane equipped trucks were operated. Alternatively boat owners could themselves return their boats to a few boat dealers in the area. All costs incurred were covered by Messrs. Kuusakoski so the recycling was totally free for the boat owners.

During the Summer 2005 about 180 boats were brought to the decommissioning area of which 50% were FRP, 20% were ABS (thermoformed by vacuum from panels of Acrylonitrile Butadien Styrene), 20% were wood and 10% of metals.

Full system launch in Summer 2006:
Following the experience gained during Summer 2005, "Finnboat and Kuusakoski decided to spread the system to whole Finland. Boats could be returned to 23 recycling terminals and a few boats dealers. Also a transportation service was offered to boat owners." Costs were covered by a recycling fee. For boats under 6,0 metres, the fee was €10 per metre boat length, and for boats over 6,0 metres the fee was € 150 per tonne. Because of very efficient recycling system the cost for boat-owner could be kept so low.
Transportation service was quite expensive with the price of € 70 per hour. Trailer rental was free. During Summer 2006, 250 boats were collected, most of them of FRP.

The report says the following with regard to the future:
"Kuusakoski and Finnboat will continue to recycle boats in Finland throughout the year. It is predicted that the cost of recycling will be the producers' responsibility as mentioned earlier."

Kuusakoski AB (www.kuusakoski.com) is the leading industrial recycling company in Northern Europe and one of the largest refiners and suppliers of recycled materials in the world. The main markets are Europe and Asia. Founded in 1914 the Kuusakoski Group OY in 2005 had total revenues of € 811 million and more than 3300 employees.

E. A brief note on "Recycling Insurance":

Länsförsäkringar's "Recycling Insurance" is a unique insurance product that helps to ensure reduced long-term environmental impact by providing the following advantages:

- *For the consumer* who does not have to pay for the recycling since these costs have already been met by the recycling insurance;
- *For the environment* as the producer is actively encouraged to develop environmentally friendly products through the system of offering lower insurance premiums for easy-to-recycle products;
- The easier the products are to recycle, the lower the premium will be;
- *For the producer* who together with the insurance company formulates solutions that insure against an uncertain future and that are suited to the company and its products.

How does the insurance work? In general terms: The producer (manufacturer / importer) pays for the recycling (decommissioning) of the product in question by paying a one-off premium to Länsförsäkringar Miljö when the product is sold (or at another appropriate moment for instance when registered). The product covered by the insurance is marked and registered so that it can be distinguished from other products;

- The product is sold to the consumer, and is covered by the insurance until it is due for decommissioning (recycling);
- The product's final owner presents it for decommissioning (recycling). The recycler is guaranteed payment regardless of whether or not the original producer still exists;
- Once presented to an approved recycling company, the product is identified prior to being recycled. Länsförsäkringar meets the costs of the recycling[*)]. The producer does not incur any risks and is not required to pay any additional costs, even if the cost of the recycling is higher than estimated;

Recycling Insurance - A financial guarantee for future recycling:

- The system must work even if the producer – for any reason – is no longer in the market;
- Funds cannot be accessible for other purposes;
- Sufficient funds to cover future costs for the recycling of concerned products;

- Recycling Insurance is one way to handle all of these aspects;

*) *Note:* So far, however, the system is based on the boat owners themselves bringing the ELB to the decommissioning plant. This may obviously represent a weak link in the system, in that there is no money available from the fund to pay for the transport to the plant of a left-alone ELB the owner of which cannot be identified. A simple solution was however proposed as an element of the project summarised in Annex 1: If the prepaid premium includes a calculated additional transport cost specified in the identification documents, the owner who brings her or his boat to the decommissioning plant herself/himself will have the transport fraction in return upon presentation of the registration document or label.

F. **<u>Cooperation on waste management:</u>**

Conclusion 7 c of Annex A: "With regard to FRP waste: The total FRP industry to cooperate (not only boat builders)".

To rationalise handling of FRP waste, the need for cooperation is obvious. Although the boat builders were early in grasping the opportunities given by the new materials back in the early 1950s, there are today numerous other applications for fibre reinforced thermoset polymers, eg. in transport, agriculture and farming, water supply and sanitary, offshore industry, wind turbine blades and aerospace - just to mention a few. The challenge of decommissioning of FRP products at their End-of-Life is, however, in common.
In section VI is pointed out the need for the boat industry to establish binding alliances with major waste managing operators who will take full responsibility for proper treatment of all actual categories of waste referred to prevailing legislation. The total process of decommissioning must be in line with the ICOMIA Sustainable Boating Strategy "To establish 'environmental care' as a core value of the recreational boating industry."

ICOMIA strongly recommend that MIAs establish contact with major waste managing operators in their country/region to discuss strategies and the establishing of binding cooperation to the benefit of all parties involved.

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