

**REPORT ON THE SITUATION OF
TRAINING IN WOODEN BOATBUILDING
AND IDENTIFICATION OF GOOD PRACTICES
IN GALICIA AND SPAIN**

**WOOBTA PROJECT
2010 - 2012**

WOOBTA

Wooden Boatbuilders Training Association



APEE



REPORT ON THE SITUATION OF TRAINING IN WOODEN BOATBUILDING AND IDENTIFICATION OF GOOD PRACTICES IN GALICIA AND SPAIN by Centro Tecnológico del Mar – Fundación CETMAR (Lucía Fraga Lago, Guadalupe Martín Pardo, Flor Arenaza Gomory); Aixola, ES (Enrique Otero Barberana, Santiago Cancelas Costas, Guillermina Martínez Rodríguez, Xulio Troitiño Dapena), Consellería do Mar, ES (Lino Lema Bouzas), AGALCARI, ES (Xerardo Triñanes), and is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License](#).

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Report finished on September 2012 by the Centro Tecnológico del Mar, within the framework of the WOOBTA Project, Wooden Boatbuilders Training Association, funded by the Longlife learning Programme of the EU, under the subprogramme Grundtvig (2010-1-ES1-GRU06-20742-1).



**Skeppsholmens
Folkhögskola**
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1. OVERVIEW OF THE STATE OF SHIPYARD CARPENTRY TRAINING NATIONALLY AND REGIONALLY

The current situation of shipyard carpentry training in Spain is a logical consequence of the gradual disappearance of shipyards engaged in wood construction.

The case of Galicia is one example: in 1996 it had 91 active shipyards engaged in this type of construction which employed 450 people and was by far the most represented region in this activity. Currently, there are 20 surviving shipyards

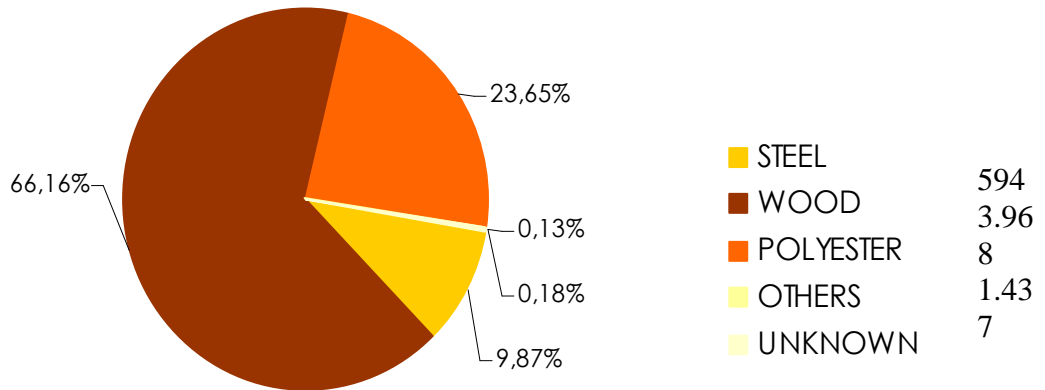


grouped together in the Asociación Galega de Carpintería de Ribeira (Galician Shipyard Carpentry Association – Galician acronym AGALCARI).

The differentiating factors that have allowed the survival of this relatively large number of shipyards in Galicia are:

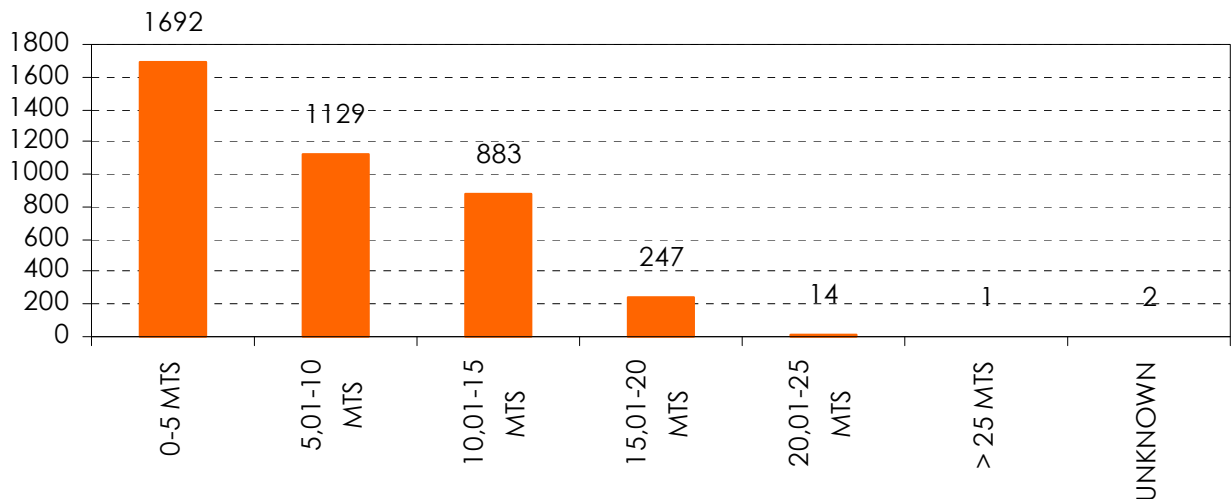
- o The existence of a large wooden small-scale fishing fleet that, in spite of a gradual decline, still maintains a large number of units. To get an idea of the importance of this fleet, the results of a study commissioned by the Asociación Galega de Carpintería de Ribeira (AGALCARI) with data collected up to 31 December 2010 are shown below.

Percentage of vessels registered in Lists Three and Four based on type of construction materials. Galicia 2010



Source: AGALCARI

Number of vessels made of wood and registered in Lists Three and Four based on length. Galicia 2010



Source: AGALCARI

These boats need repair and maintenance

- o Aquaculture: Galicia is one of the world's leading producers of mussels, with 90% of its units made of wood.
- o The growing awareness regarding the conservation and maintenance of the floating maritime heritage. The last twenty years have witnessed the emergence of numerous associations dedicated to this purpose with ties to the Federación Galega pola Cultura Marítima e Fluvial (Galician Federation for Maritime and Fluvial Culture – Galician acronym FGCMF). The restoration and new construction of replicas of historic and heritage vessels generates demand for shipyard carpentry services
- o The establishment of AGALCARI, an association of shipyards building with wood, is invigorating the sector by presenting proposals to the government, introducing new materials and techniques, and highlighting the importance of the "trade"



- o The configuration of the coast in rias – coupled with a climate that allows almost year-round sailing – facilitates recreational boating, an activity in which shipyard carpentry is beginning to play an important role.

If we refer to the rest of the Spain, we cannot but note the virtual disappearance of wooden boatbuilding, with residual and dispersed examples of this activity in Catalonia, the Basque Country, Malaga and the Balearic Islands.

National and European fishing policies on the regulation of the fleet by means of scrapping, renovation and modernisation, a sector anchored in an archaic production method and having little capacity to respond to competition from other materials, the lack of support from governmental agencies and the demand for jobs with better economic conditions led the sector to a complicated situation.

A SWOT analysis helps us understand the problems associated with training with an overview of the situation of shipyard carpentry services.

INTERNAL VARIABLES	
WEAKNESSES	STRENGTHS
Dependency on demand from fisheries and aquaculture Low market share in recreational boating, dominated by fibreglass	Progressive commitment to product diversification that is beginning to include – in addition to fisheries and aquaculture – traditional and recreational sectors
Very small SMEs, poorly capitalised and with weak sales	Existence of a dynamic professional association (AGALCARI) with the ability to act as interlocutor with the governmental agencies
Low level of intergenerational transfer	Professionals with experience and expertise in the entire process of building a boat and knowledge of the different types of traditional boats
Business management is characterised by instability and lack of resources	The ability to control the production process allows many professionals to build vessels with greater added value, using the "turnkey boat" formula
Low level of incorporation of basic ICTs in management	
Low education level of the majority of the professionals	It is an activity of a mixed, artisanal/industrial nature
Relative delay in the use of new techniques and material for wooden shipbuilding Little training in the use of these techniques and materials	Existence of an important segment open to various types of training that facilitate new technical additions and materials, without relinquishing wood
Isolation with regard to R+D+I agents and the university	Existence of a significant segment based on versatility both in terms of repair/rehabilitation and new construction as well as in the use of different techniques and materials

<p>Little awareness of its favourable environmental consideration</p>	<p>Activity with inherent environmental values: sustainable materials, low- energy processes, biodegradable product</p>
<p>Social invisibility Their own image and marketing are pending issues for the majority of SMEs</p>	<p>The activity's artisanal/industrial hybrid nature and its environmental "label" permits the development of a collective image based on quality, innovation, respect for the environment and responsible consumption</p>
<p>Dominance of work in the local market</p>	<p>There is willingness to collaborate on European projects (NEA, Dorn, WOOBTA) of a cultural nature such as the recovery of the floating heritage, local development and networking between training centres</p>
<p>Facilities needing significant improvements</p>	<p>The largest shipyards have, in general, modern facilities equipped with powerful hoisting systems and access to dock ramps</p>
<p>Problems with the traceability of the wood</p>	<p>Most labour and lumber used is sourced locally</p>

EXTERNAL VARIABLES (T: (THREATS – O: OPPORTUNITIES)

THREATS	OPPORTUNITIES
Crisis in small-scale fishing and future reduction in the number of boats, counterbalanced by the rise of inshore fisheries using fast, light fibreglass boats	The majority (72%) of the fishing fleet is wooden
Removal of support from the EU for the new construction of fishing boats	The significant presence over the medium term of wooden aquaculture and fishing boats permits predicting a continuation of the repairs and maintenance section in the coming years
	Support for aquaculture shipbuilding is currently being maintained until 2013
Unfair competition with GRP, defended by the powerful plastics industry	Based on European (FEP) and Spanish (PEN) fisheries policies – which consider the environment and the positive assessment of selective small-scale and sustainable fishing as a future point of reference – the environmental "plus" of building with wood may encourage an increased demand for fishing and aquaculture boats that are more efficient in consumption and more environmentally friendly
Local forestry that gives priority to short-rotation species and limits the supply of quality lumber for shipbuilding Increased imports of lumber not always of certified quality	Increased social awareness of the need for a change in forestry policy that will give priority to forestry management aimed at quality timber production.
Uncertain land use planning and the identification of shipyard carpentry as being among the annoying and unhealthy activities	Socially added value due to the product's environmental label

<p>Social image linked to a declining sector using obsolete techniques</p>	<p>It is expected that shipyard carpentry will be considered for future museum-related projects and other projects related to local development</p>
<p>Abandonment by the various administrations, which do not promote a modernisation and regulation plan based on other building materials</p>	<p>Regulations for wooden shipbuilding are in the process of being developed through AGALCARI.</p>
<p>Little social value of occupations that require a medium-long training programme, such as shipyard carpentry</p>	<p>Growing increase in social prestige in the field of wooden recreational sailboats</p>
<p>Few training options in either formal education or continuing education Shortage of training courses appropriate to industry needs</p>	<p>Existence of training centres in line with current demand and supported by governmental agencies, which are beginning to establish contacts at the national and European levels to improve the exchange of experiences (the WOOBTA Project)</p>
<p>Difficulties in job placement of students from existing training centres</p>	<p></p>
<p></p>	<p>Particularly noteworthy is the presence in Galicia of companies producing new wood products and treatments that could enable the use of good quality input materials at competitive costs in the future</p>
<p>Little support from governmental agencies for traditional navigation and recovery of the floating heritage</p>	<p>The progressive social consciousness with regard to the maritime heritage will determine a greater burden of work in the section of vessels of heritage interest in the future</p>

<p>Lack of traditional involvement in wooden yachts</p>	<p>Although small-scale, there are possibilities of accessing the recreational boating market, either in the section of boats built with new techniques and materials and inspired by traditional vessels, in the rehabilitation of "classic" recreational boats, or providing services to marinas and port marinas</p>
<p>Reductions in the competences of the carpenters with regard to construction projects Excessive administrative requirements at the time of application for construction permits</p>	<p>The commitment of some medium-sized shipyards to the construction/rehabilitation of large yachts or sailing ships built of steel can generate a greater demand for carpenters for the specific work related to interiors and decks</p>

Table based on data from the Centro Tecnológico del Mar (Sea Technology Centre). Sector Study. Shipyard carpentry: technological renovation respect for the environment and training

With regard to training centres and as a result of the reasons explained above, we can identify the existence of different situations in Spain.

- o GROUP I: Formal (officially recognised) training centres, dependent on the relevant department of education: There are three: "IES Rambla Prim-Consorti el Far" located in Barcelona, "IES San Feliu" in San Feliu de Guixols in the province of Gerona, and "IES Miquel Biada" in Mataró in the province of Barcelona.
- o GROUP II: Informal (not officially recognised) training centres: we are aware of the existence of one in Galicia: the "Centro de Formación A Aixola", another one in Menorca, the "Centre de la Mar" in Mahon and a project development phase, the Centre for Maritime Culture in Pasaia Ondartxo, Guipúzcoa.
- o GROUP III: Specific, short-term learning experiences:
In Galicia, organised by the Os Patexeiros Association in the Port of Lorbé, Oleiros City Council.

2. SPECIFIC CONDITIONS RELATED TO TRAINING IN SPAIN:

2.1 LEGAL/ADMINISTRATIVE FRAMEWORK FOR SHIPYARD CARPENTRY TRAINING

Group I. Formal education Applicable only in Catalonia, structured in the "Technical maintenance of pleasure boats and port services" intermediate-level training cycle. Regulated by the Regional Government of Catalonia through Order EDU/93/2007 of 11 April.

GROUP II. Non-formal education

1. Programme of workshop schools and youth training centres regulated by the order from the Ministry of Labour and Social Security dated 29 March 1988, and whose management was gradually transferred to the different autonomic communities (in the case of Galicia by means of Royal Decree 1375 RD/1997). This legislation is in the process of being changed and new projects with the old format are currently not being granted.

2. The A Aixola Centro de Formación of the Department of Marine Affairs (Galician Regional Government) managed by the Centro Tecnológico del Mar – Fundación CETMAR since 2004, which offers training courses aimed at the maritime fisheries sector. As part of these courses, training in wooden shipbuilding (shipyard carpentry, new woodworking techniques, development and installation of wooden decks, marine carpentry and working with polyester, infusion in moulds and carpentry) has been continuously offered since 1997.

3. The "Centre de la Mar" on Menorca, regulated through Royal Decree 229/2008 of 15 February and established at the Centro de Referencia Nacional en Náutica (National Nautical Reference Centre), which enables it to plan and execute innovative, experimental and training-orientated activities related to vocational training that serve as a reference for the development of vocational training for the overall National Vocational Qualifications and Vocational Training System.

This centre is responsible for drafting the professional certificates of wood boatbuilding. Level 1, lasting 280 hours (with fibre glass and coatings), is in progress, it was published in the Official Journal on December 24, 2011, and it will be given at this Centre from next autumn. Level 2, is specific on wood, it lasts 450 hours and was completed in November. Its publication on the Official Journal is currently pending. Level 3 is being designed at the moment.

GROUP III: Specific, short-term training linked to associations related in part to the maintenance and preservation of the floating maritime heritage.

2.2 TRAINING ACCESS AND REQUIREMENTS

Group I. Formal training

The access requirements are:

- .- Possess the Secondary Education Graduate certificate
- .- First-level technical assistant qualification

- .- Successful completion of the second year of secondary school (Spanish acronym BUP, part of the former educational system)
- .- Have other educational qualifications considered equivalent for academic purposes
- .- Have passed the university entrance examination for students over 25 years of age

The characteristics of the training programme are:

- .- Duration of two academic years (2,000 hours) Theoretical training is alternated with on-the-job training in the various trades related to the maintenance of boats (mechanics, electronics, carpentry, compounds, sailmaking, etc.). Specifically, shipyard carpentry training lasts 110 hours Three secondary schools (Spanish acronym IES) are participating in this training programme: IES Rambla Prim in Barcelona, IES Miquel Biada in Mataró (Barcelona) and IES San Feliu in San Feliu de Guixols (Barcelona)
- .- Ongoing programme, financed by the Department of Education of the Catalanian Regional Government

Group II. Continuing education

1.-A Aixola Centro de Formación

- Age limit between 16 and 65 years of age
- Preference for persons belonging to the maritime fisheries sector
- Courses of varying duration. Those related to woodworking range from 600 hours for "Shipyard carpentry", "New woodworking techniques" and "Nautical carpentry and polyester", to 200 hours for "Infusion in moulds and carpentry", including 300 hours for "Development and installation of wooden decks"
- Ongoing programme offered at no cost to students. Financed by the Department of Marine Affairs of the Galician Regional Government.
- Students chosen from among a group of those voluntarily pre-registering

2.-"Centre de la Mar" National Reference Centre Mahon, Menorca.

There are no requirements to access the Level 1 professional certificate, that is the only one approved and published at the moment.

Furthermore, during 2011-2012, two other courses took place addressed to the long-term unemployed not receiving government assistance:

- A 380 hours long course, addressed to people with an income level of less than 75% of the minimum wage, with the intention of making it equivalent to a Level 1 vocational certificate.
- One course, currently in progress, of the so-called "specialty training" lasting 700 hours, that will be deleted from the program once the Level II professional certificate begins.

Group III Specific learning experiences

The requirements for access to the shipyard carpentry beginning in October 2011 organised by the "Os Patexeiros" Association in Lorbé are:

- .- Unrestricted registration
- .- Two courses. The Beginners' course of 50 hours and the Advanced course of 50 hours.
- .- Four hours a day on Saturday afternoons
- .- Financed through the payment of a symbolic fee to support the activities of the Association
- .- Taught in the workshop of a local shipyard carpenter

2.3 QUALIFICATIONS AND ACCREDITATIONS

GROUP I: the qualification of "Pleasure craft maintenance and port services technician" is awarded. This is academically equivalent to the "Intermediate Training Programme"¹ type issued by the Department of Education of the Catalan Regional Government.

GROUP II: training is demonstrated by means a diploma lacking academic value.

¹ Corresponds to Level 3 in the European Reference Framework

1. At the youth training centres, the diploma is from the City Council sponsoring the project, with the logos of the Autonomous Community and the European Social Fund; on the back are the training contents successfully completed.
2. At the A Aixola Centro de Formación, the diploma is from the Centro Tecnológico del Mar – Fundación CETMAR (the foundation managing the Centre), backed by the Department of Marine Affairs of the Galicia Regional Government and the Centro de Formación A Aixola itself. The course content appears on the back of the diploma for this course as well.
3. At the Centre de la Mar, there is currently a certificate of attendance. Starting next year, they will issue the Level I professional certificate corresponding to the course “Auxiliary maintenance of structural elements and of surface coatings of sporting and recreational boats operations”.

GROUP III: Diploma from the organising association

2.4 TRAINING CENTRES

GROUP I

IES Rambla Prim – Consorci El Far

I.E.S. Rambla Prim

C/ Cristófol de Moura 223

Cantonada Rambla Prim

08019 Barcelona

Telephone: 93 307 9960

Web site: www.iesramblaprim.info

Consorci El Far

C/ Escar 6-8

08039 Barcelona España.

Telephone: 93 221 74 57

Fax: 93 221 41 50

Email: escola@consorcielfar.org

Training manager: Alexandro Bosque

Web site: www.consorcielfar.org

IES San Feliu de Guixols

C/ Canigó 41

17220 San Feliu de Guixols (Girona)

Telephone: 972820118

Fax: 972820910

Email: b7003318@xtec.cat

Web site: agora.xtec.cat/iessantfeliu/moodle

IES Miquel Biada

Avda Puig i Cadafalch 89 – 99

08303 Mataró (Barcelona)

Telephone: 93 798 1489

Web site: biada.org/HTML/biadapress

GROUP II

- 1.- Centro de Formación A Aixola
Porto pesqueiro s/n
36900 Marín Pontevedra
Telephone: 986 838033
Fax: 986 838197
Email: aixola@cetmar.org
Training manager: Henrique Otero
www.cetmar.org/aixola
- 2.- Centre de la Mar
C/ Ruiz i Pablo 13

07702 Mahón Menorca

Telephone: 971369000

Email: crnnautica@caib.es

Web site: www.treballiformacio.caib.es

3.- Centro de la Cultura Marítima ONDARTXO

Ondartxo pasealekua 1

20110 Pasai San Pedro

Email: albaola@albaola.com

www.albaola.com

GROUP III

Asociación cultural mariñeira de Sada “Os Patexeiros”

Apdo. Correos nº 3

15160 Sada Coruña

Email: patexeiros@hotmail.com

www.patexeiros.org

3. SHIPYARD CARPENTRY GOOD PRACTICES FACT SHEETS

Like any other industrial and economic activity, shipyard carpentry needs raw materials and energy for it to operate. These, along with human activity throughout the production process, always generate some type of impact on the environment.

Currently, there is a greater social awareness about the need for sustainable development. That is to say that the economic and productive activities should not jeopardise the future of the generations to come. Thus, attempting to minimise insofar as is possible the already low environmental impact generated by its activity is considered to be of priority interest for the sector itself, and is one of its greatest arguments against other shipbuilding sub-sectors. This way – in addition to complying with current legislation – a better social image of the product (a boat

built of wood) is attained, and this could lead to a positive economic impact on this professional activity.

The use of good practices in shipyard carpentry entails the use of measures throughout the **activity's entire production process** aimed at improving the quality of the activity in terms of the environment, and this will also impact positively on the improvement of working conditions as well as on the end results and the costs invested.

The measures to be adopted would not necessarily have to involve large investments and innovative revolutions in our daily work; on the contrary, we already are familiar with many of them and use them often. The application of common sense and simple changes in habits will do the rest, thereby helping to improve our day-to-day work and its end results.

Shipyard carpentry as a productive activity requires **facilities** (usually by the sea) with their associated storage areas, offices, services, dry dock and shipyard, the consumption of raw materials (wood and wood products), and **natural resources** like water, and electricity . Working with the machinery causes **environmental pollution** (in the form of noise and dust) and generates a series of **wastes** that must be treated.

3.1. FACILITIES-RELATED ISSUES

3.1.1. In the area of offices and adjacent compartments:

- We should consider the sources of heat, air currents and cold when we determine the processes and job positions. Perform proper maintenance of HVAC systems.
- We must prioritise the use of natural light, designing work stations properly. We will also use energy-saving lamps and install fluorescent tube shades.
- We will use light-coloured paint in the decoration of warehouses, business premises and offices.
- We will insulate warehouses, business premises and offices against noise.
- We will minimise the emissions of ozone from photocopiers, separating them from the working environment.

3.1.2. Good environmental practices with regard to the inputs used (water, energy)

In this section, consideration is given to the measures to be adopted in the consumption of energy and water, resources that are determining factors and used on a daily basis at work, as well as how to prevent or minimise the pollution, discharges or emission of water.

- We will carry out proper maintenance of pipes and facilities in order to improve water consumption, trying to reuse water wherever possible and installing water-saving systems.
- Avoid the contamination of rainwater by channelling stormwater.
- We will use energy-saving systems, keeping the machines on only for the time required, using efficient machines and carrying out proper and regular maintenance of machines and equipment.
- We will monitor the moisture content of the wood in order to prevent losses due to the deterioration of materials.
- By installing frequency converters in the suctioning equipment in order to constantly adapt it to the sawdust and shavings generated, we save energy.
- We will reduce the use of packaging and containers, reusing them and using them as efficiently as possible.
- We will prevent leaks in the compressed air systems by means of periodic reviews, and their use will be optimised.
- By installing frequency converters in the suction systems, we will save energy.

3.2. RAW MATERIALS-RELATED ISSUES

3.2.1 Good environmental practices with regard to the purchase of materials and compounds

- Buy wood from forests that are sustainably managed, both socially and environmentally. Ensure they have quality and chain of custody certifications.

- Purchase the materials and compounds needed for the job, avoiding excessive amounts (which means more spending and wastes). It is quite helpful to carry out an inventory and create a plan for the raw materials.
- Seek out products and/or compounds that are less aggressive to the environment: water-based solvents / detergent without phosphates or chlorine / non-corrosive cleaners / paints and varnishes made with natural ingredients / adhesives obtained from renewable resources.
- Avoid the purchase (and handling) of materials processed or treated with compounds that produce toxic emissions and pollutants, such as panels made of fibreboard with formaldehyde or wood impregnated with solvents that affect the respiratory tract.
- Establish written procedures for inspecting raw materials in a clear and simple fashion upon receipt.
- Verify that the materials and products we buy are labelled correctly and with perfectly clear instructions for use in an official language.
- Check the technical specification sheets and safety sheets for the product (characteristics, toxicology and hazard rating), as well as the appropriate procedure for its use, transport and storage. This minimises the risks of accidental contact and ensures the proper treatment of the waste it produces.
- Ask suppliers to supply products in containers made from recycled, biodegradable and returnable materials, if possible. This will help in the reduction of wastes. For example, containers having the maximum volume possible of resins, paints, varnishes and solvents should be used, based on the consumption needs defined.

3.2.2 Good environmental practices with regard to the storage/warehousing of materials and compounds:

- Orderly storage of each material and compound in its corresponding place and conditions: lumber warehouse, solid wood storage area, plank storage area, scrap storage area, hardware and anchors storage area, chemical (glues, solvents,

varnishes, finishes, dyes, paints, etc.) storage area, miscellaneous items (sandpaper, containers, packaging, etc) storage area.

- We should review the storage facilities on a regular basis in order to prevent leaks and damage to products. The appropriate measures and instructions in the event of spills or discharges must be clearly posted and easily visible.
- It is also necessary to have available materials such as sawdust or sand that allow any possible chemical spills to be absorbed (once used, these will be considered to be hazardous and toxic wastes).
- Extra care must be taken with regard to the accumulation of chips and sawdust due to the risk of fire and to their ability to cause illnesses of the respiratory tract due to inhalation.
- Store wooden planks on vertical or horizontal shelving, so that they are properly vented and quickly accessed. This avoids wasting time and damage to materials.
- Reducing the storage time of raw materials helps to minimise waste production; thus, the use of materials must be properly managed.

3.2.3 Good environmental practices with regard to the handling/use of materials and compounds:

- Carry out an inventory and create a plan for the materials and compounds to be used.
- Create clear and simple labels for the raw materials stored, indicating the product's traceability and warehouse logistics: Product class / Date of receipt of the product in the warehouse / Rules governing the use and handling of the product / Product expiry date / Measures in the event of spills, emergencies, fire, etc.
- Rotate the stored materials and products appropriately in order to use the products closer to the expiry date. This avoids generating waste as a result of loss of the product's characteristics and its non-use.
- Work with a *standardisation* of the materials using a minimum of variety. This optimises the use of compounds and substances and simplifies inventory, minimises the risks of the products expiring and generate less waste.

- Use the compounds up completely and leave the containers completely empty. This reduces consumption (increased profitability) and prevents contamination from leftovers remaining in the containers.
- Close containers of resin, paint and varnish tightly, thus avoiding the deterioration, evaporation and turning into waste of these products.
- Replace highly polluting glues, varnishes and paints with others having less impact, thus collaborating in the reduction of emissions into the atmosphere. Should this not be possible, they should be purchased in a way that minimises the generation of waste from the original containers.
- Use and handle carefully chemicals with risk of toxicity from skin contact. These adversely affect health and can give off gases and/or generate hazardous waste.
- Bringing the work up-to-date technologically will improve environmental conditions.
- Maximise the yield of raw materials, thus reducing energy consumption, the emission of dust and noise and the generation of waste.
- Optimise the use of wood to reduce consumption and minimise the generation of waste. To do this, define the most efficient way to cut and take apart the product.
- For the caulking and finishings treatment stages, we should properly plan all the steps to be taken in order to achieve a reduction in the consumption of sandpaper, caulking products, paints, solvents, etc., as well as a reduction in the generation of wastes,

3.3. GOOD ENVIRONMENTAL PRACTICES WITH REGARD TO MACHINERY, TOOLS AND EQUIPMENT

- We will work with environmentally friendly, energy-saving machinery, ensuring that: it does not use polluting lubricating oils/ they have a good power consumption/work ratio: energy efficient / water-saving / produce little noise (otherwise, use sound insulation) / produce little dust and few gases.
- We will clean the machinery and collect the dirty water or solvents with the possibility of recycling them.

- We will choose quality, durable tools and machinery.
- We will carry out an ongoing maintenance of tools and machinery. We will review drains, heating, plumbing installations, etc., on a regular basis in order to maintain them properly.
- We will not use fire extinguishers with halons as they are highly detrimental to the ozone layer.
- We will use appropriate suctioning equipment that will prevent the emission of dust into the atmosphere, as well as environmental filters.
- If possible, natural gas will be used as fuel.
- We will design appropriate work procedures to minimise the wastes generated in each production process.
- We will keep the machinery on only the time that is essential in order to make a rational use of energy.

3.3.2 GOOD PRACTICES FACT SHEETS



Title: Handbook of Good Environmental Practices in shoreline carpentry

Description:

This handbook aims at contributing towards ecological certification in wooden shipbuilding, by presenting a set of good practices, in order to minimise environmental impact of this industrial activity.

Objectives put forward in this handbook are:

- Assessment of the environmental strengths and weaknesses of the sector when compared to other sectors.
- Promotion of the 3Rs strategy, namely; reduction, reutilisation and recycling.

- Promotion of the environmental aspects of the activity, to all workers, suppliers and clients.
- Achievement of rational use and consumption of raw materials, electricity and water.
- Prevention or minimisation of atmospheric emissions, excessive noise and waste generation (solid and liquid).
- Reduction of amount of wastes generated and their adequate management.
- Knowledge and compliance of valid environmental legislation.

Type of material:

Teaching material: information document mainly directed towards managers and workers at wooden boat building yards as well as suppliers of wood, materials, products and machinery related to such activity, not forgetting the actual users of such vessels.

Methodology: motivation to use a set of measures in the entire production process, in order to improve quality from an environmental view point, which in turn will contribute positively to improving working conditions and return on investment.

Training type: Informal training at job site.

Languages in which material is available: Spanish

Entity carrying out the activity: Centro Tecnológico del Mar –CETMAR-Foundation

Contact persons: **Ms. Guadalupe Martín Pardo / Mr. Enrique Otero Barberena**

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Strengths:

- Uplift social image of this centenarian activity.
- Based on contributions from experts and persons who know the profession, in an attempt to integrate and adapt tasks of shoreline carpenters to the applicable environmental rules in the E.U., Spain and Galicia.

Weaknesses:

- Misconception by the sector that use of good practices implies significant investment or new "revolutions" within daily routines.

3.4. GOOD ENVIRONMENTAL PRACTICES WITH REGARD TO WASTE MANAGEMENT

3.5.1. Classification and storage

- We will classify and separate the wastes according to their type: wood, metal, paper, glass, toxic and hazardous wastes.
- We will use specific approved containers for each type of waste; these will properly labelled and marked with the relevant symbols and codes.
- We will facilitate the storage of solid wastes by compacting them, thereby minimising the volume and space they occupy.
- Knowing the characteristics of the different types of wastes produced in the shipyard carpentry production processes is fundamental to managing them.
- Minimise the generation of wastes by using materials that can be easily recycled or reused.
- We will reuse leftover of wood, planks, sawdust, shavings, etc. as by-products generated by the main activity for in-house uses or possible raw materials

for other activities (biomass, fuel briquettes) or other uses useful for the company. Avoid accumulating it unnecessarily.

- We will avoid mixing waste that is similar to urban solid wastes with toxic and hazardous wastes because this converts them all into toxic and hazardous wastes, thus preventing us from reusing or recycling the former.

- Register as a producer of wastes: we will notify the pertinent entities of the wastes generated, their codes, amounts, storage processes and final destinations. Possible hiring of an *external* waste management service provider.

- Reduce the storage period of the wastes produced: two years at most for waste that is similar to urban solid wastes, and six months for toxic and hazardous wastes. Properly package or dispose of the toxic and hazardous wastes.

- Avoid building permanent storage tanks for wastes on unauthorised land (your own or adjacent); do not burn or bury the wastes produced.

- Have an appropriate fire-fighting system in the waste storage area.

- We will protect the toxic and hazardous wastes from inclement weather that leads to a risk of spills and discharges. Avoid heat in the toxic and hazardous waste containers, since most of them are flammable or can be altered due to heat.

- Reuse boxes, containers or plastic items whenever possible if they are not contaminated.

- Recycle wastewater if possible: by distilling solvents and cleaning acetones they can be reused.

3.5.2. Pollutants emitted to the atmosphere

An attempt will be made to reduce as much as possible atmospheric emissions from:

- The equipment used for the extraction of dust, sawdust and shavings by using appropriate filters.

- Organic solvents.
- Combustion gases.
- The extraction of air from booths.
- The noise of machines (noise pollution).
- Painting and varnishing booths.

3.5. WASTES MANAGEMENT SHEET



Title: Wastes management and new shipbuilding techniques for shoreline carpentry.

Description:

This manual has been produced to cater to the sector demand. Its objective is to fulfil such demand by informing professionals from the wooden shipbuilding industry, about steps to be taken, in order to identify, store, and deliver wastes generated by their activity, thereby complying with the legal requisites.

Type of material:

Teaching material: information document mainly aimed at shipyard workers that build wooden vessels. It can also be of interest to teachers and students related to such activity, as well as for users of such vessels.

Methodology: motivation to apply a set of measures for wastes management and awareness that the right approach to waste management begins through acceptance that the least dangerous waste is the one that is not produced.

Training type: Informal training at job site.

Languages in which material is available: Galician

Entity carrying out the activity: Centro Tecnológico del Mar –CETMAR-Foundation

Contact person: Mr. Enrique Otero Barberena
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 Fax +34 986 296 019
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Strengths:

- Arises as a result of the demand from sector professionals.

- Summarises and explains the entire E.U., Spanish and regional legislation on this subject in a simple manner.
- Provides answers to the most frequent questions on this subject.

Weaknesses:

- The continuous changes in the applicable legislation means that the handbook gets out of date in a short time period.
- It is essential that there be increasing acceptance within the general population towards waste management, reutilisation and recycling of materials.

4. GOOD ECONOMIC AND SOCIAL PRACTICES FACT SHEET

Artisan trades can often serve as a bridge for integrating people at risk of social exclusion either due to leaving school or various other reasons.

Shipyard carpentry is of great interest in this approach because it is a craft in which carpenters must establish a relationship with the wood they are shaping in a way that takes advantage of the forms and peculiarities of each section of wood, but it also technical because they must reproduce the shape of a boat that can sail. The work can be orientated towards maintaining the floating heritage, but also combined with the introduction of new technologies. Working with one's hands is necessary in order to shape the wood, but one must also work with one's head in order to calculate that shape and tailor it to the components available. In addition, wood is a living material that requires a systemic approach for it to be treated properly. Its properties depend on the life of the tree from which it came: how it was planted, logged, its subsequent treatment...as well as how the piece of which it will be part of is cared for.

Thus, when training for this trade, one learns learn something more than handling materials, and this enhances employability and serves as a means of social inclusion.

Below is an overview of the training in wooden shipbuilding available in Spain from the perspective of its suitability for the so-called "groups with difficulties in finding work" and "groups at risk of exclusion":

- Unemployed individuals older than 45 years of age
- Young people
- People with disabilities
- Children with guardianship held by institutions
- Victims of abuse

The national programme of workshop schools and youth training centres, currently active and offering specialisations in shipyard carpentry, has identified the beneficiaries as young men and women of 16 to 25 years of age who are unemployed and, in many cases, have left school without having obtained the compulsory secondary education qualification. These programmes also admit persons with disabilities provided the facilities and the workplace health and safety standards allow it. The beneficiaries receive travel expenses the first six months and during the last months they receive the amount paid by a training contract. The El Far (Barcelona) and Cambrils (Tarragona) youth training centres are of this type.

The selection criteria at the Centro de Formación A Aixola includes aspects such as employment status, being female (due to the low representation of women in the sector) and collaborates with centres providing guardianship for minors. It also considers that neither age nor disabilities (provided they can meet compulsory workplace health and safety measures) are a problem.

The SUMAR Programme in which the Calafell City Council is participating specifically targets young men and women who are unemployed and have failed at school, with particular emphasis placed on school attendance aimed at obtaining the compulsory secondary education qualification. The course is followed by a minimum six-month internship at companies and a training contact.

The "Auxiliary maintenance of structural elements and of surface coatings of sporting and recreational boats operations" course taught at the Centro de la Mar on Menorca was aimed at long-term unemployed persons with incomes of less than 75% of the minimum wage. While the course is running, the beneficiaries are paid a percentage of the minimum wage.

5. MODELS OF COLLABORATION IN TRAINING FOR THE SCALE MODEL CONSTRUCTION OF BOATS

The proposal made by the Centro Tecnológico del Mar – Fundación CETMAR / Aixola within the WOOBTA project consisted of two traditional boats that are representative of shipyard carpentry in Galicia: the dorna and the gamela coruxeira. In addition, at the express request of Les Ateliers de l'Enfer, they were provided with documentation regarding the lancha de relinga, which is also known as the lancha xeiteira.

The proposals put forward by the French, British and Swedish members consist of the construction of models and/or half-hulls of, respectively:

- The Breton vessel called "Plate du Golfe".
- The Cornish working boat characteristic of the River Truro called the "River working boat".
- The Swedish vessel called "Langbat".

5.1. PLANNING FACT SHEETS FACT SHEET NO. 1

NAME OF VESSEL: Gamela

TYPE: *Coruxeira*

OVERVIEW: This is a traditional boat of the lower rias whose maximum expression can be found in the coastal town of Coruxo located in the Vigo Ria. Its main characteristics are: flat, square bottom or, in other words, "with two sterns". Another

distinctive feature is the blade of the rudder that is submerged well below the bottom of the boat and functions as a keel.

USE: A vessel of remote origin, with variations found along the entire Atlantic coast. Traditionally used for inshore fishing in areas near the coast; its flat bottom facilitates it being beached.

RIGGING: Lugsail with a large windward bolt rope

MAIN CHARACTERISTICS:

Length:	4.41 metres	Beam:	1.80 metres
Depth:	0.55 metres	Girth:	2.82 metres



FACT SHEET NO. 2

NAME OF VESSEL: *Dorna*

OVERVIEW: Built using the clinker/lapstrake method with five pairs of planks that form a deep keel, an almost-vertical bow stem and pentagonal-shaped aft mirror box.

RIGGING: Bolt rope sail

Length:	4.10 metres
Beam:	1.70 metres
Depth:	0.80 metres



FACT SHEET NO. 3

NAME OF VESSEL: *Lancha de relinga* or *lancha xeiteira*

OVERVIEW: Sturdy boat adapted for use on the open sea. Built carvel style, perhaps its most obvious characteristic is the presence of "two prows", i.e., that it has a pointed stern. The water lines have a U-shaped profile in the middle, while at the forward and aft ends, the profile changes to a V-shape, thereby gaining a high level of stability and sailing performance.

RIGGING: Typical bolt rope sale that gave the vessel its name

Length: 8.20 metres

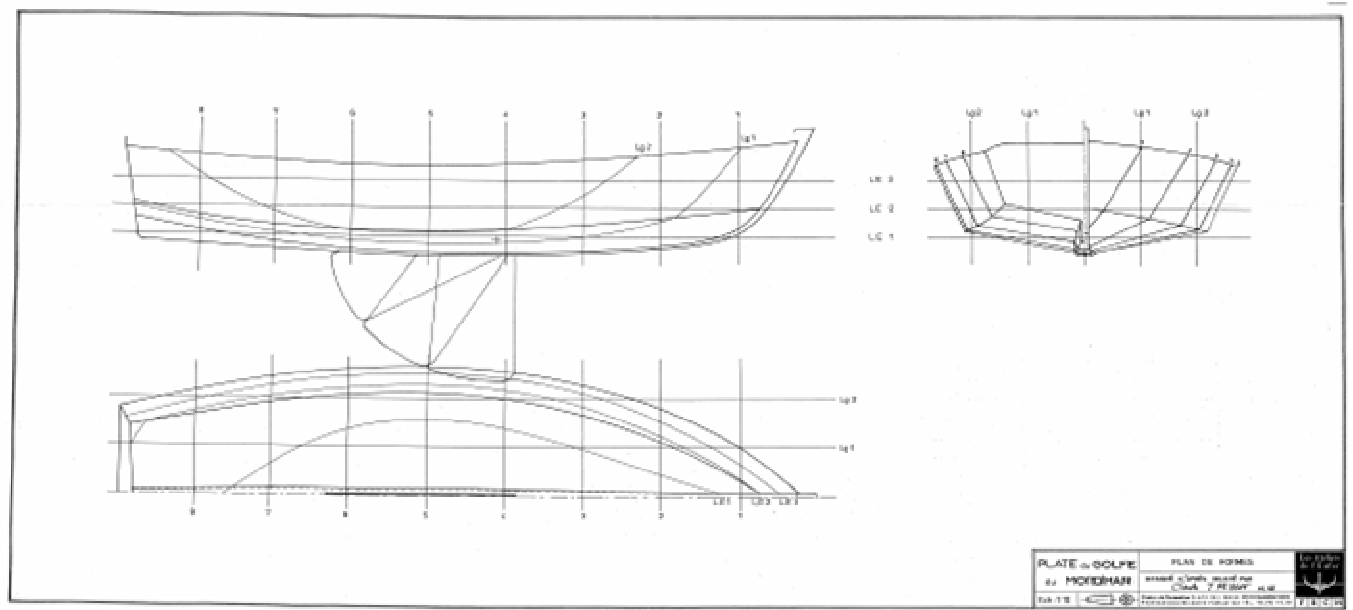
Beam: 2.76 metres

Depth: 0.81 metres

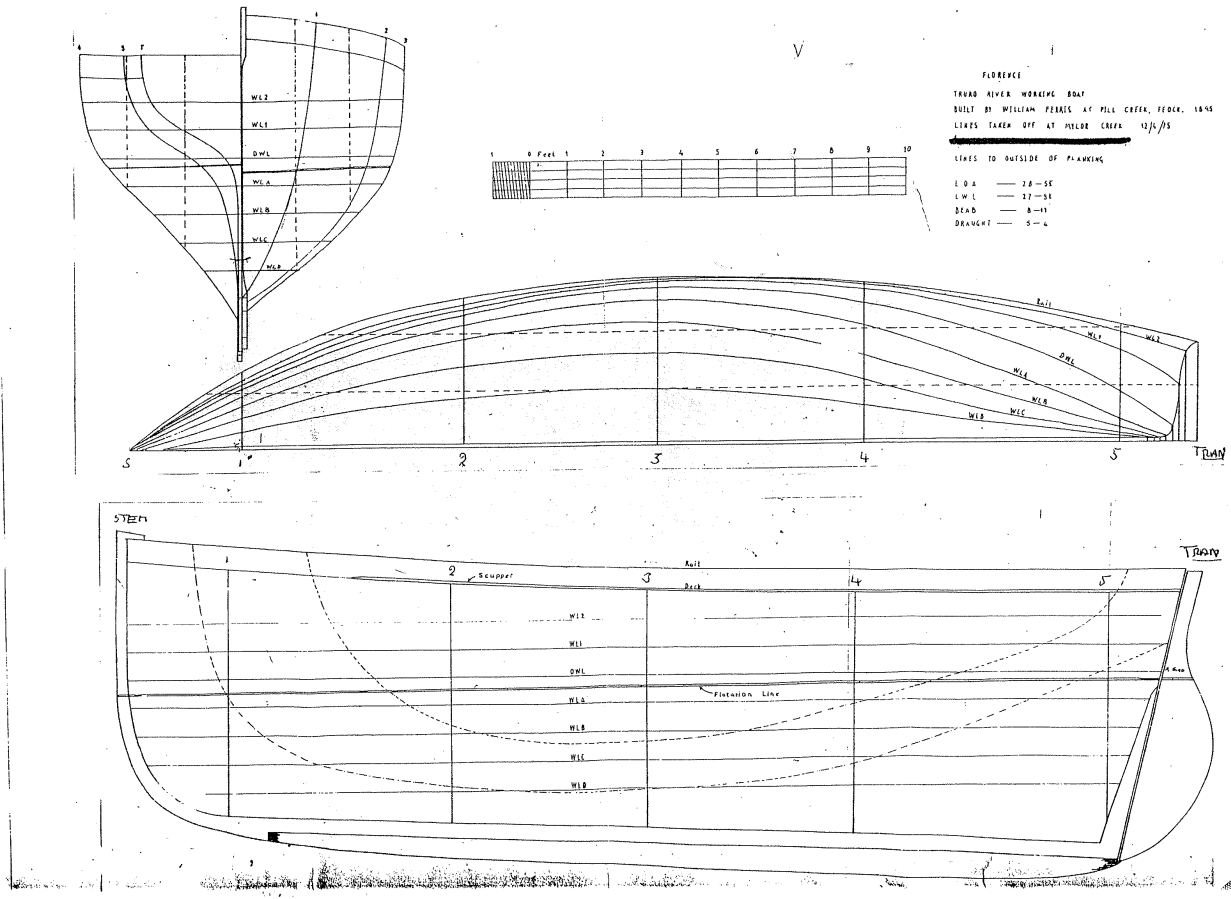


5.2. BLUEPRINTS

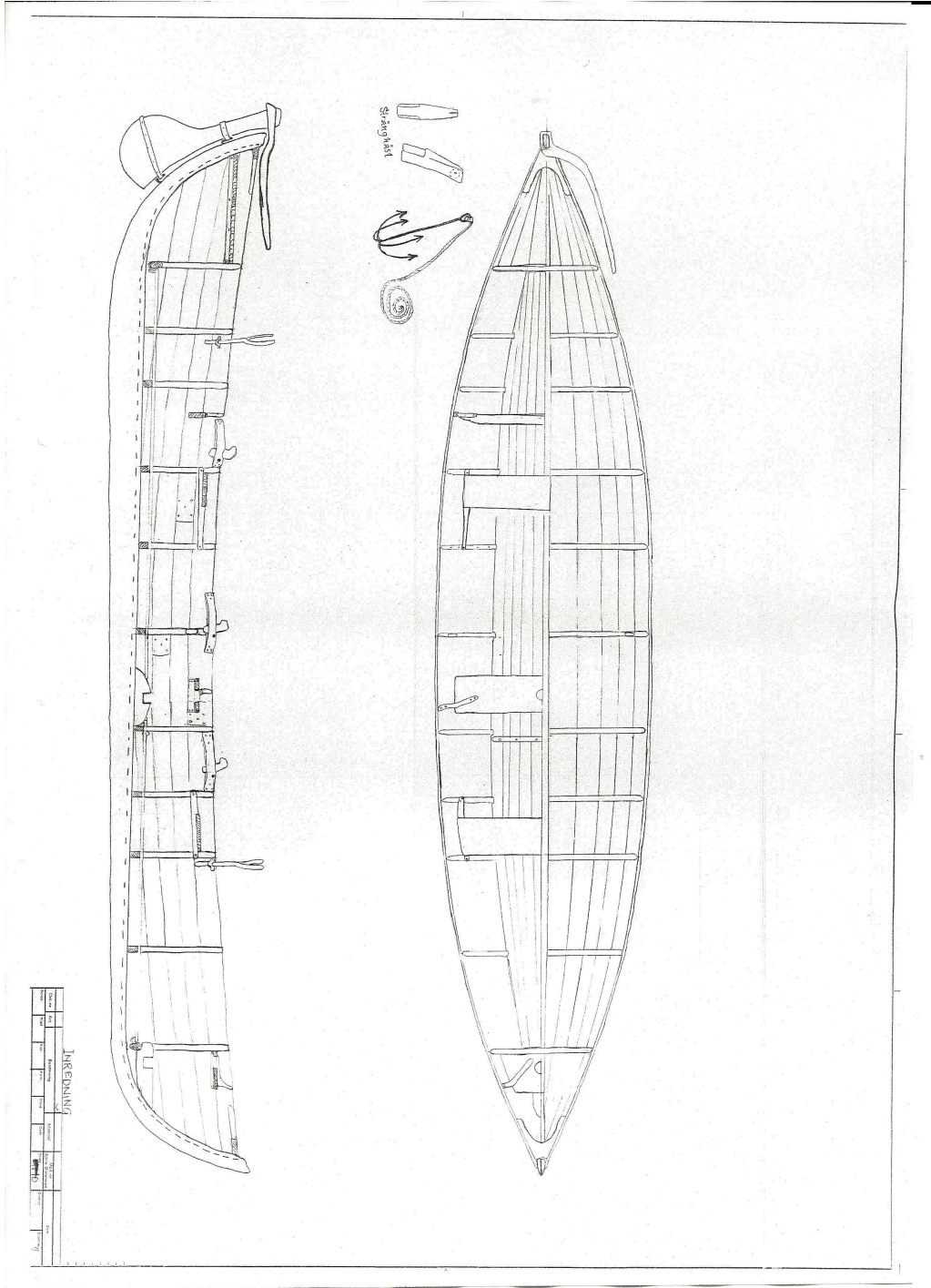
5.2.1 Plate du Golfe blueprints



5.2.2 Truro river working boat blueprints



5.2.3 Langbat blueprints



5.3. EXECUTION AND COLLABORATION BY THE STUDENTS

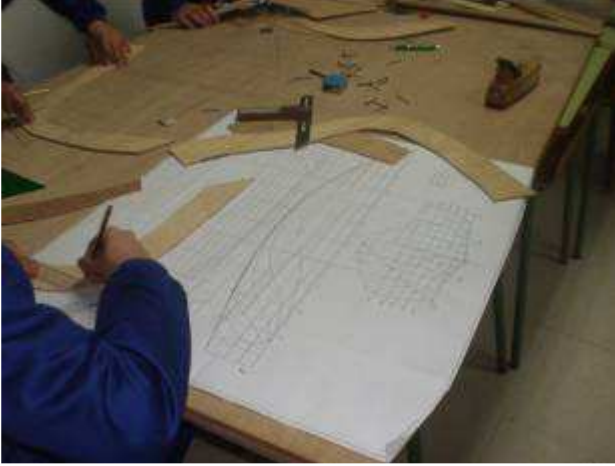
In keeping with the spirit of the Woobta Project, the Centro de Formación A Aixola began planning the work associated with the construction of the scale models and half hulls of the ships suggested by the members, whose main objectives were:

- .- To energise and motivate the students by means of a proposal for the construction of traditional boats from an unfamiliar environment based on a few simple blueprints.
- .- Liaise with training centres to clarify procedures and queries that arise during the construction process.
- .- Use the vessels' "peculiarities" vessels to consolidate knowledge in important aspects such as the intimate relationship of their designs with the geographical environment and their social function.
- .- To compare methods and ways of working with wood and finishes.
- .- To prepare the exhibition that will be held at the end of the project.

In this way, during the course on "shipyard carpentry" scheduled at the Centre that lasted for six months, work began on building models of the British and Swedish ships and then on the construction of the half hull of the Cornish vessel.

Graphic documentation of the construction processes are shown below.

5.3.1 Construction process for the Breton "Plate du Golfe"



5.3.2 Construction process for the Swedish Langbat



5.3.3 Construction process of the "Florence", the River Truro working ship



6. SUMMING-UP

The professional training in wood ship building offered in Spain responds to very different realities:

- The vocational education and training (VET), currently applied in Catalonia, is organized around the demand of a multipurpose professional profile. The agents involved within the recreational boating sector look for operators to be assigned to works in the marinas, and whose profiles cover from installations to sail making, passing through composites, electricity, engines, rigging, management..., etc. This approach, that provides 110 hours of carpentry workshop out of a total of 2,000 hours of training, does not guarantee either the transmission of the knowledge of the trade nor the generation change.
- Access to training at the trades centers (Casas de Oficios / SUMAT Programme), does not come given, in most cases, by the desire or at least, the attraction to wood as a working material, but by a situation definable as “lack of job opportunities”, usually increased by the school failure. In this situation, the fact of getting remuneration becomes a double-edged weapon that we need to manage in the correct manner.
- The recently created Centro de Referencia Nacional “Centre de la Mar”, responsible for establishing the competences needed to obtain the professional certifications levels, I, II and III, will become essential in terms of echoing the real competences needed to deal with wood ship building while legislating for all Spain. In this sense it would be desirable the establishment of connections between the Mediterranean reality (focused on a multipurpose maintenance) and the Atlantic one, with an industry still alive in the wood ship building sector, as we find in Galicia.
- The training center A Aixola, with an open philosophy, free access, no age limit and no benefits given, combines the best features of the previous options

and eliminates the negative factors, such as a compulsory access or the sometimes distorting reception of benefits.

7. EXPECTED COURSE OF DEVELOPMENT

The situation of the wood ship building in Galicia presents some particular characteristics when comparing it to the rest of Spain:

- Existence of an active industry associated around AGALCARI. , constituted by 15 wood builder shipyards.
- Important presence of wood in professional vessels that require maintenance and repair.
- Important aquiculture sector, with numerous wood vessels and still building with this material.
- Increasing involvement of the public administration.
- Numerous associations bound to the preservation of the floating heritage united around the Federación Galega pola Cultura Marítima e Fluvial (FGCMF)
- Great tradition in wood ship building with many living professionals.
- Existence of a training center, A Aixola, with 14 years of experience teaching Wood ship building and derivatives.

These characteristics make desirable a future towards:

- The integration of marine engineers in wood (and derivatives) ship building training programs is desirable. The ideal situation would be the signature of agreements that allow future engineers to do internships at shipyards, as it is currently being carried out at the Escuela Náutica Superior de Pasajes and the Ondartxo shipyard in the Basque Country.
- A technological adjustment of the traditional knowledge that means an extra value and never a substitution, because this would imply the loss of the soul of this magnificent trade.

- To consolidate the few existing training centres in the field of wood boatbuilding.
- A technological adjustment of the traditional knowledge that means an extra value and never a substitution, because this would imply the loss of the soul of this magnificent trade.
- The necessary introduction of wood building in recreational boating. The first steps given with vessels like the dorna “Sara”, built at the shipyard Hermanos Garrido or the racú of the shipyard Triñanes, mark the beginning of proposals and prototypes that make possible to take a place in this important market.
- The demands of the Galician society in terms of sea heritage preservation and maintenance are adding one more factor of hope for this industry.
- The contribution of this kind of industry to the environmental conservation is particularly important, manifesting it throughout its productive process, from the raw material to the end of the vessels useful life, passing through the building process. Sustainable raw material, CO2 drain, autochthonous resources, low polluting and low energy consuming productive process and a biodegradable final product make up a reality impossible to achieve for other materials.
- We must make the Administrations see that turning the “Polluter pays principle” upside down, they should give preference not only to those who don’t pollute but also to the ones that help environment.
- To favor meetings among the countries around us by means of European projects such as the Transnational Atlantic Area Programme, called DORNA (Desarrollo Organizado y sostenible de Recursos en el Noroeste Atlántico) or the Project we are currently working in, that gets in touch different wood carpentry training centers. These projects, whilst favoring the meeting of the countries, show the steps to be given in terms of necessities, requests and common programs to make room in the market for this important activity.

- It should also be favored the contact between shipyards working in the countries around us to exchange knowledge and techniques. It would be important as well the creation of a net that allows us, the crossing user, to have at our disposal information from different countries about the shipyards working with wood, for repairs or maintenance, adding this way extra value to the vessels.
- Another possible course of action related to the two previous ones could be working towards the exchange of students, or even workers, among countries around ours. This would favor the knowledge exchange and would interlink very efficiently training centers and shipyards.