

Vessel having furniture and / or cladding made of TVW

DELIVERABLE D 5.12
TV4NEWOOD PROJECT

**AGREEMENT NUMBER:
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Milanto

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ThermoVacuum: name of the process and name of plants

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THE TV4NEWOOD PROJECT: the role of MRG

Mediterranean Refitting Group (MRG) joined the project in March 2016.

The aim of our activities is to test the use of the new VacWood® in the maritime sector.

Such thermovacuum treated woods were then used in the pleasure yacht refit industry, main activity of Mediterranean Refitting Group srl.

The reasons why it was worth investing in this project are various:

- the versatility and the easy use of the chosen types of woods
- the chance of saving money on the purchase of raw materials
- the possibility of finding the needed material within the European Union which means an incentive and an upgrade in the local production
- the durability and resistance arising from the treatment, which are key factors for the use in the pleasure yacht refit industry
- a lower environmental impact for the production and the transport of the wood and thanks to an almost nonexistent use of chemicals

The project allows to use different type of woods:

- White fir
- Spruce
- Maritime pine
- Beech
- Poplar
- Ash
- Oak

MRG chose to use the following wood species:

- Beech
- Ash
- Oak
- Spruce

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The above-mentioned wood species are usually considered of a low quality and are usually used only in industrial manufactures such as furniture, floors, windows and doors or more in general for veneering.

For sure, with some rare exceptions for oak, it is barely thinkable of using such wood species in the pleasure yacht refit industry where up to now, the use of tropical woods such as teak or iroko was preferred; the result has always been a cost of raw materials which could be 8 to 10 times higher than the one we've chosen.

In order to develop the project, our company asked some boat owners to take part to the trial and their boat were used to test VacWood® for the construction of part of the outside deck and some furniture. One of the boat is "Asperanziella", a 10 meters motor yacht which took part to the famous classic yacht regatta "Viareggio-Bastia-Viareggio", where she was able to show her new features.

Another boat where MRG tested VacWood® was the beautiful 15 meters sailing boat "Milanto", a very well known product of the famous Finnish Nautor Swan shipyard, where the side decks, the roof and the cockpit were completely rebuilt.

Another one was "Mr. Bean", an open motor yacht of about 12 meters, where MRG worked on the bow area of the outside deck.

A fourth project we're working on is another motor boat, an Aprea Mare 12 meters where the aft platform is currently being rebuilt with VacWood® ash.

On "Asperanziella" the used wood was ash, treated at 220°, while on "Mr Bean" and on "Milanto" beech was the chosen one, treated at 180°.

Also on Aprea Mare we chose to proceed with thermo treated beech at 180°

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IMPORTANT INFORMATION ABOUT THE CHOSEN WOOD SPECIES AFTER THE HEAT TREATMENT

Please note that the following specifications apply only to the work conducted by MRG.

OAK:

Use:	Durable and valuable furniture Doors, windows, floors, stairs and internal carpentry Construction of small ships thanks to its weathering
Resistance	Loadbearing structures, structural carpentry Barrel staves Shelter beams
Maintenance:	Simply daily cleaning, for longer periods cleaning with oil
Working:	Good and easy working; easy to cut both fiberwise and perpendicular to the fibers; all cutting tools can be used: plane, milling cutter, drill etc. During planning a small amount of fibers can arise; good flexibility, easy finishing works on a well prepared surface; good attitude to be assembled; quite elastic and malleable; must however be bent carefully in order to avoid surface tears

ASH

Uses:	Simple furniture, floors and steps, windows and doors
Maintenance:	Standard cleaning with warm water, for extra maintenance, use of natural oil.
Working:	Easy to be worked, sawed, planed; easy joining both with screws and nails, however the holes must be pre-drilled; drying is smooth but with the chance of distortion, layers do

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not detach often, gluing is easily feasible. Painting and varnishing offer good results even if the surface should first be treated with a sealer.

BEECH

- Uses: Simple furniture
Structure and frame for armchairs and couches
Windows, door and stairs
Internal finishing
Wood products such as: veneered panels, plywood, chipboards
- Maintenance: Standard cleaning with warm water, extra cleaning with oil stain and wax
- Working: Easy working thanks to its compact fibers; good resistance to bending; easy to be planed, sawed, milled, easy to be cut fiberwise. Drying might be a bit slow, but delayering gluing and painting are easily feasible; joining through gluing is the best solution; joining through screws and nails needs a predrilling

SPRUCE

- Uses: Various uses
Internal and external cladding
Windows and doors
Furniture
- Working: Spruce is easily workable and easy to be glued. An important presence of knots is to be taken into account; they can cause problems to milling operations; joining through nails and screw does not guarantee the best

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results; drying is usually smooth as well as gluing and painting.

The above provided descriptions are important to stress the fact that any kind of wood species, above all those considered less valuable, may undergo the VacWood® treatment with excellent results.

As already stated the costs for the raw materials are for sure much lower (up to 60% less than tropical wood species) and the availability of such wood much bigger.

WORKING WITH THE VACWOOD®

VacWood® may be sawed and worked just in the same way as untreated wood. Any kind of tools can be used: saw, drill, plane etc; with very low efforts, the result is a smooth surface, ready to be transformed.

Working on VacWood® only requires a bit more attention because the thermovacuum treated wood, compared to the raw one, tends to crack more easily: i.e. wood planks shall be transported with a good protection in order to avoid any damage for example on the corners.

Dust generation must be taken into account when working on VacWood®: VacWood® dust has a slightly smaller particle size than normal softwoods because that wood is particularly dry and can bother; that's why a good extraction system must be provided when working with VacWood®, as well as protective masks.

JOINTING

The best results are reached with the use of pneumatic nailers; attention must be paid to the correct pressure and the nailer's drive length; nails should be fixed 1 cm deep.

The use of a standard hammer is not advisable because the wood might crack; the use of stainless steel nails is preferred in order to reduce the risk of discoloration of the wood because of the presence of rust.

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A good result is offered also by galvanised nails especially when a topcoat is applied to the cladding; To prevent splitting, small oval-headed nails would be the most suitable.

Should screws be used, these ones need to be carefully screwed at the level of the wood's surface.

Pre-drilling and countersinking is essential, just as when working with hardwood. Stainless steels screws with countersunk heads are most suitable in outdoor usage or other humid environments. For the best holding strength, coarse-thread screws perform best. Self-tapping screws can be used with VacWood® without pre-drilling.

Thanks to its lower capacity of absorbing water, when gluing with water-based glue pressing time shall increase. The use of polyurethanic or resin-based adhesive is also suitable; as for any other surface, the preparation of the material before gluing is essential.

VACWOOD® MAINTENANCE

When used outdoors, VacWood® shall be treated with a protective paint because UV radiation from sunlight and weathering may affect the wood's colour and cause small cracks.

Discoloration may be avoided by treating the wood with pigment-base paint; the most suitable one is a transparent paint where brown pigments are added so that it very much looks like the original wood colour.

Protective paints must in any case be applied on a regular base; pigment-containing transparent surface treatment has a doubled or tripled maintenance interval in comparison to a treatment product without pigments.

PRACTICAL APPLICATIONS

Mediterranean Refitting Group is a highly specialized company in the pleasure yachts refit industry; as a member of the TV4NEWOOD project, the shipyard was very happy to be challenged with the experimental use of this new material within its refit activity.

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As previously mentioned, the wood species that are usually used in this field are the more valuable teak and iroko ones, above all because of their solidity and resistance.

Costs are however very high and it is not always easy to convince a boat owner to spend so much money on a cosmetic adjustment to their boat even if this becomes an improvement.

That is why the VacWood® has represented a valid alternative.

Here following, we are going to describe in details how our company has used the VacWood®:

PREPARATION

The raw wood arrived to our carpentry where it was firstly roughly cut and sent to be thermovacuum treated



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The planks have then been sent to the company ALAC in Recanati, which proceeded to the thermo treatment of the wood



Meanwhile we prepared some thermovacuum treated wood samples so that we could have a palette of colours and products to be shown to the clients.



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Material was ready to be treated at Alac's premises

PREPARING THE MATERIAL

The carpenter proceeded to the cut of the planks of the needed size.



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After the cut, the carpenter created some moulds in order to test if the sizes were correct, before installing them on the boat

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THE WORK ON “ASPERANZIELLA”

“Asperanziella” is a 10 meters long motorboat where the deck, the cockpit and the aft platform were completely covered with teak. The teak areas were quite damaged and because of its age showed a very high wear and tear and the owner was more than happy to join this project.

“Asperanziella” will take part to classic boats festivals where the refit project will be presented and this will be a very good opportunity to make our work visible to the public and to future potential customers.

The idea was to proceed to two different constructions: the side decks were built with teak while the bigger areas, the cockpit and the aft platform, were built with VacWood ash.

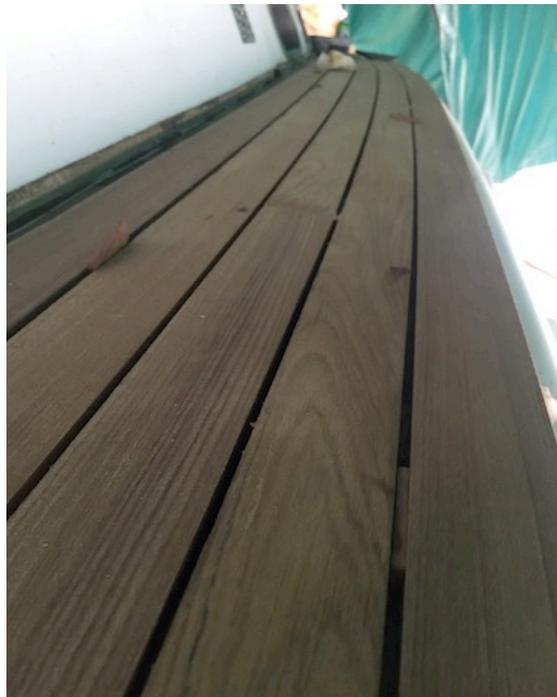
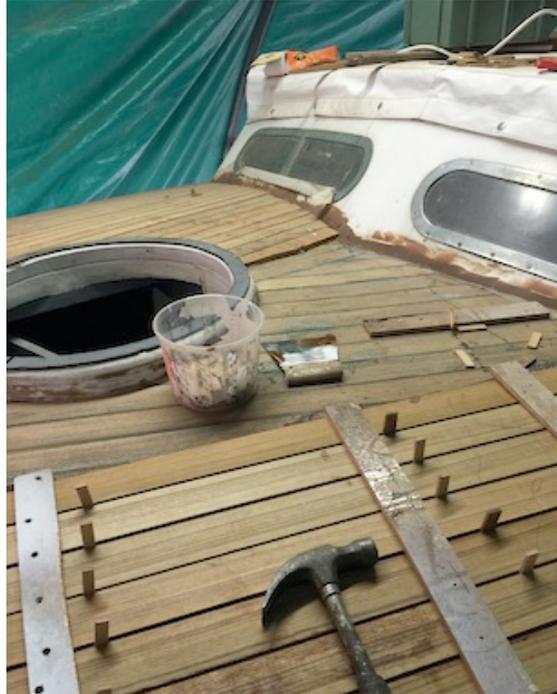
This was done in order to be able to appreciate the differences between the two species, particularly over the long term.

Work stages on “Asperanziella”: preparation of the surfaces, removal of the old wooden deck, positioning and gluing of the new planks

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The pictures below show the old cockpit; the area which was rebuilt with Vacwood® treated wood



The internal furnishings were removed and rebuilt with Vacwood® treated beech while the floor was replaced with VacWood® treated oak.

Before the installation, the VacWood® treated wood is prepared in the carpentry: black rubber is positioned between the planks so that a ready product can be mounted.

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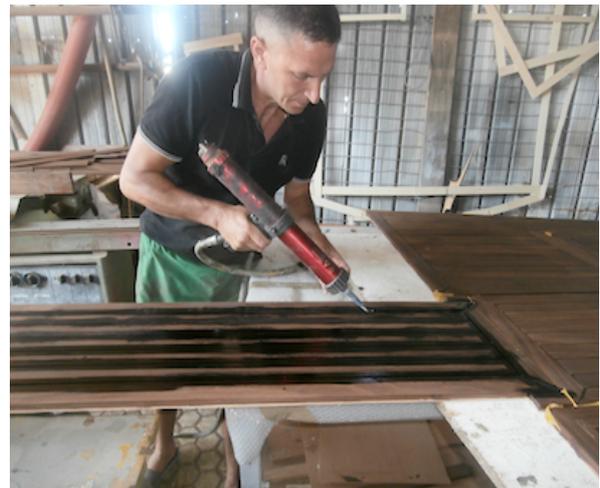


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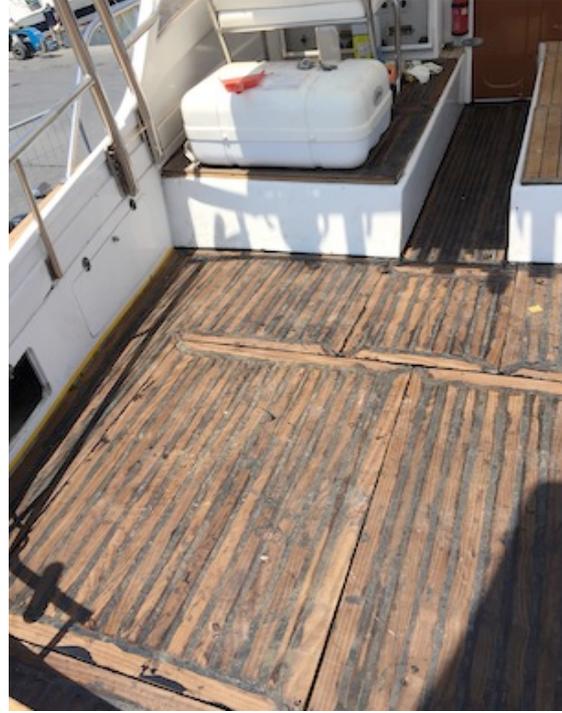


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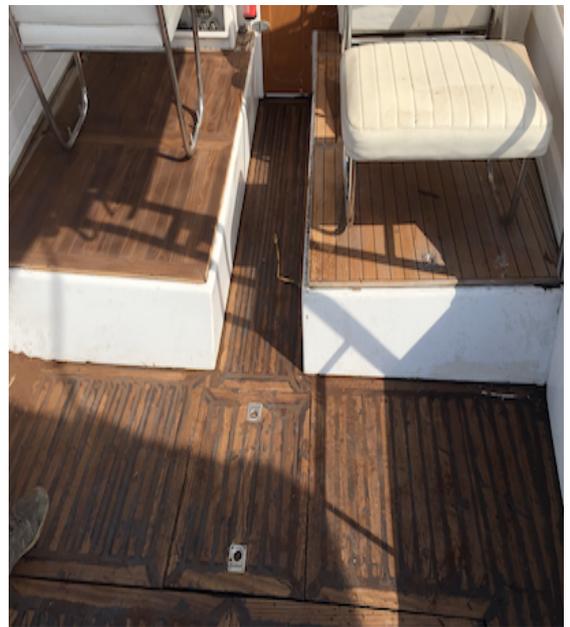
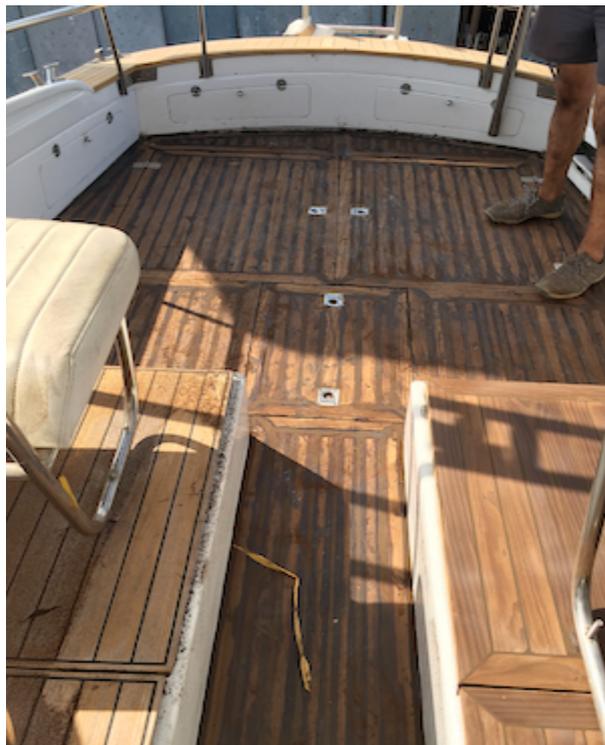


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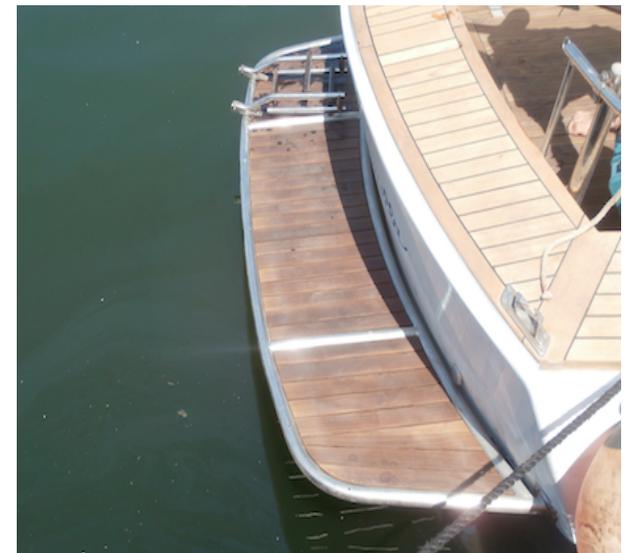
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THE FINAL RESULT



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THE WORK ON “MILANTO”

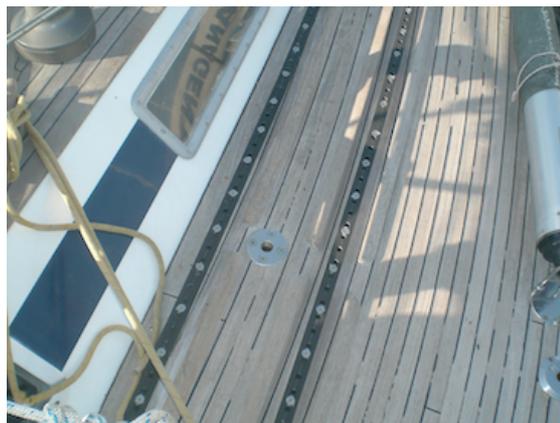
“Milanto” is a 15 meters long sailing yacht, built by one of the most famous shipyards in the world, Nautor Swan Finland.

The teak deck was particularly worked out and both the side decks, the roof and the cockpit needed to be replaced.

Together with the owner, we decided to use VacWood® treated beech, treated at 180°.



Original deck



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The dismantlement of the old teak deck

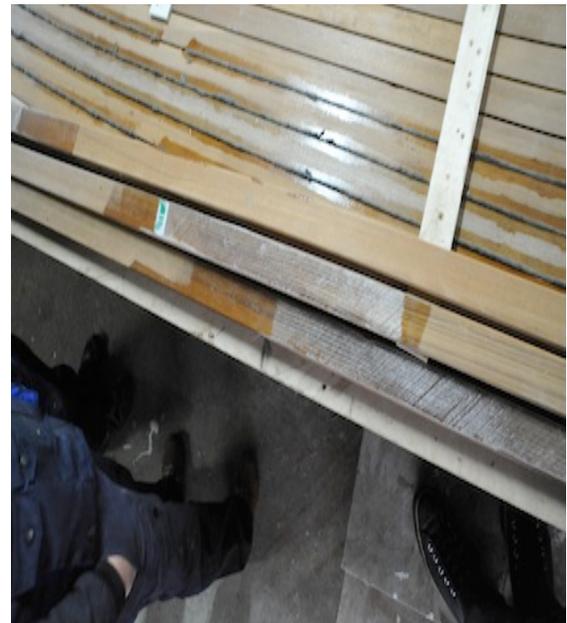
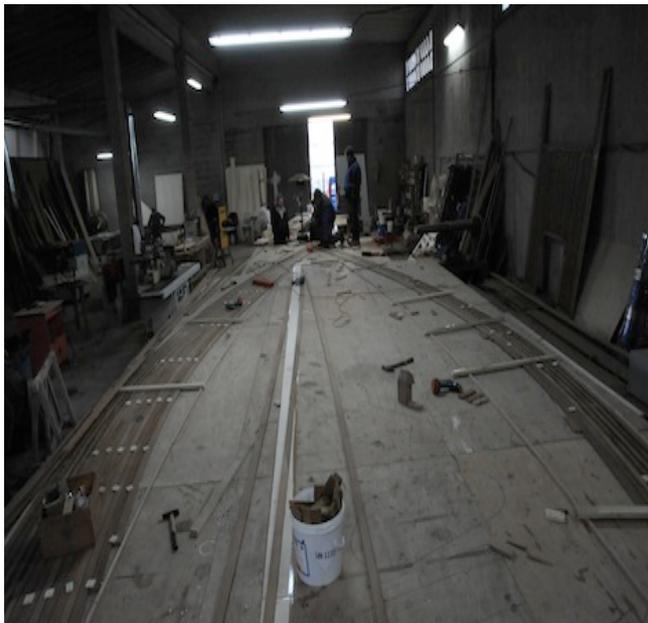


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PREPARATION OF THE MATERIAL AND THE MOULDS

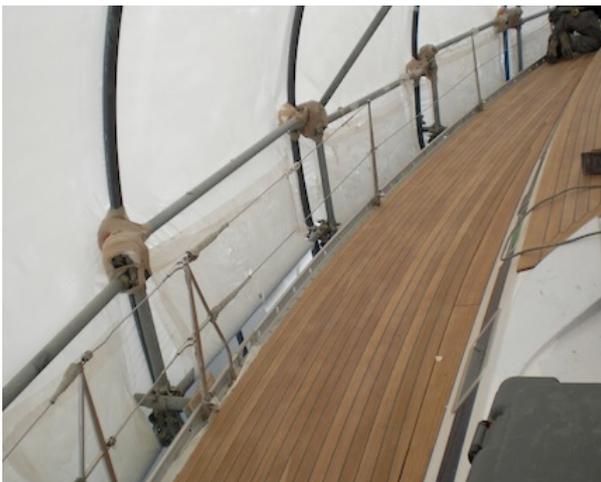


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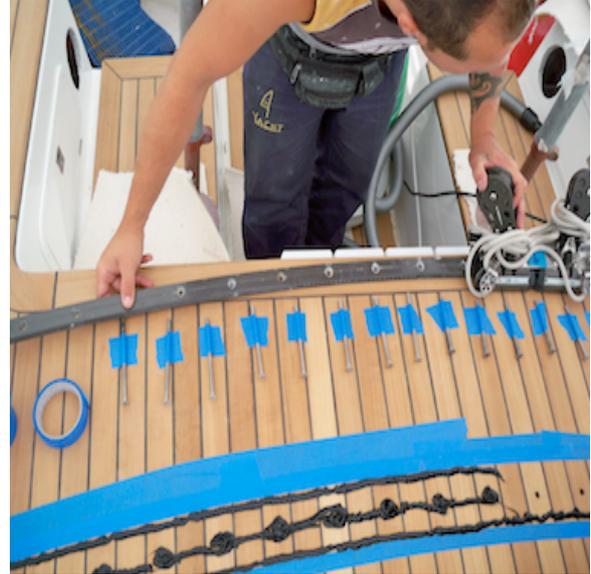


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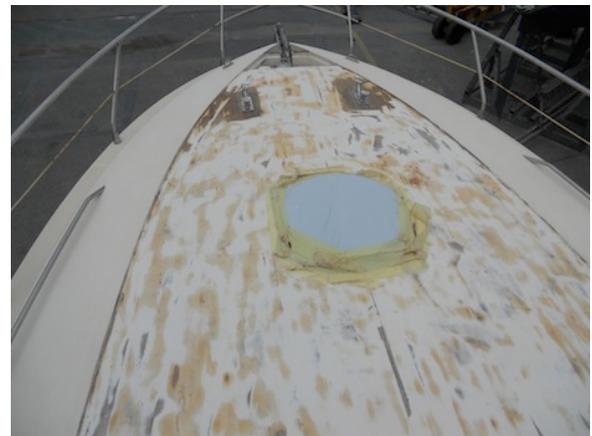
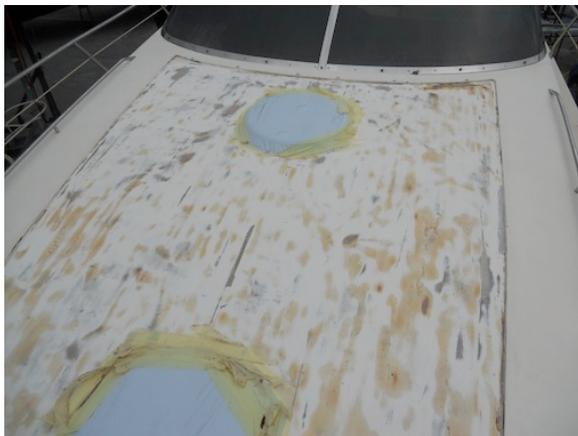


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THE WORK ON “MR. BEAN”

Mr. Bean is a motor yacht of about 12 meters in length; on this boat the outside deck on the bow are was rebuilt; beech was used and it was treated at 180°:

THE DISMANTELEMENT OF THE OLD TEAK DECK



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THE WORK ON APREA MARE

The aft platform of the Aprea Mare 10 meters, was rebuilt with beech which was thermotreated at 180° here following some pictures before the works



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