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MARINE CASE STUDY

INCREASE EFFICIENCY - REDUCE WEIGHT:

RE-ENGINEERING OF AN ELECTRIC DAY CRUISER

LITORE | ONE

The aim of this case study is to demonstrate the positive impact 3D|CORE™ products have on the efficiency, economy and sustainability of watercrafts and their production.

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THE CLIENT: LITORE®

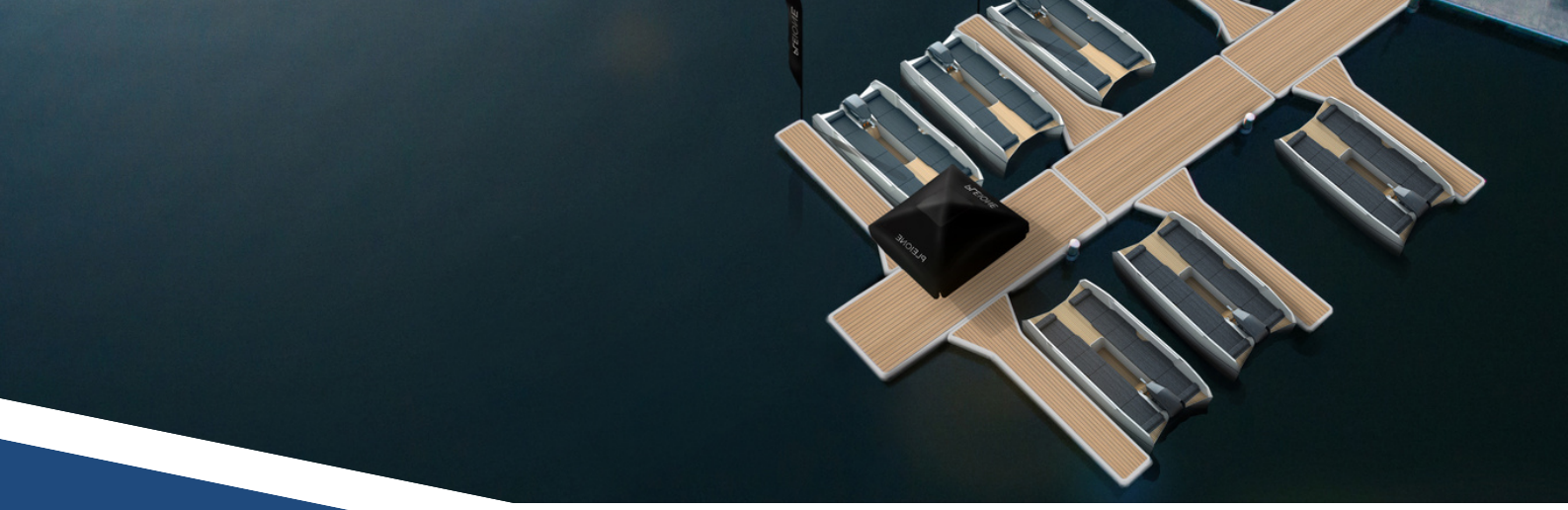
Our client, the Slovenian recreational boat manufacturer LITORE®, aims to develop elegant, easy-to-use boats that are built and used with minimal environmental impact. CEO, Aleksander Nemec, and his team can look back on years of experience in the research and development of boats. To support the trend towards environmentally friendly leisure activities and deceleration, LITORE® has been designing user-friendly day cruisers with electric motors since 2018. By working together with Torqeedo®, the market leader for electric mobility on the water, watercrafts from LITORE® clearly distinguish themselves from environmentally harmful products from competitors.

THE INITIAL PRODUCT: LITOREIONE®

Part catamaran and part sun lounger, the LITORE|ONE® is the ideal platform for a relaxing day in sheltered waters. The exterior design is minimalistic as well as symmetrical and is enhanced by a spacious deck. The four lounge seats can be comfortably converted into sunbathing areas. The flat deck also offers a recess for the legs, a sliding table as well as a 50l storage space for food, equipment and personal items. The day cruiser can be ordered in a wide range of finishes and configured to create a customized solution. The stable and efficient multihull design combines space and comfort with an everyday range and accompanies passengers into a new era of sustainable and easy boating.

BUT

At 350 kg, the LITORE|ONE® has a very high weight without any real benefit. This is caused by the complex manufacturing process using hand laminate and the monolithic structure. Although the spacious deck would allow room for more passengers, the passenger capacity is limited to 4 persons due to the lack of freeboard.



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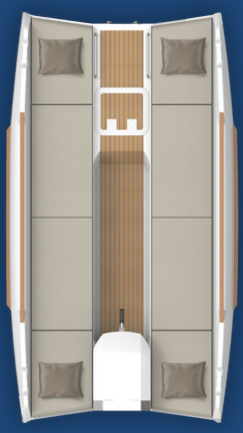
LITOREIONE®: THE CHALLENGE

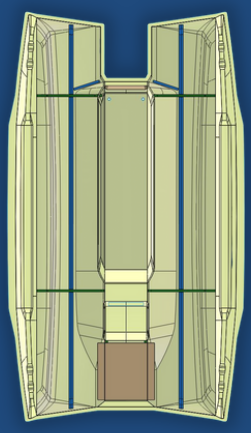
The challenge for LITORE® was to adapt the production process and their product to the customers' wishes. An improved laminate plan had to combine a lower weight with the originally required strength. As the LITORE|ONE® was specifically designed for hotel resorts and boat rentals, an economical, fast and sustainable solution was needed. So to enable efficient production, the existing moulds for hand laminate had to be adapted for the vacuum assisted resin transfer moulding process (VARTM). This approach was cheaper than building new moulds.

Our lightweight experts in the marine sector quickly realized: this will not be easy - but still achievable and so they took up the challenge.

3DICORE™: THE TASK

- Optimize the laminate plan
- Reduce weight
- Reduce production time
- Optimize production process
- Reduce cost
- Increase efficiency





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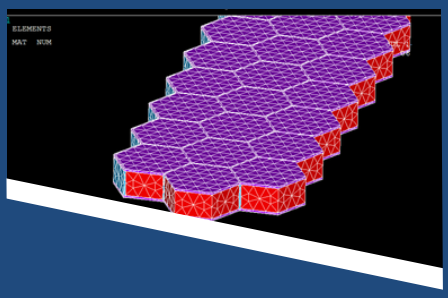
3D|CORE™: THE SOLUTION

☑ OPTIMIZE THE LAMINATE PLAN

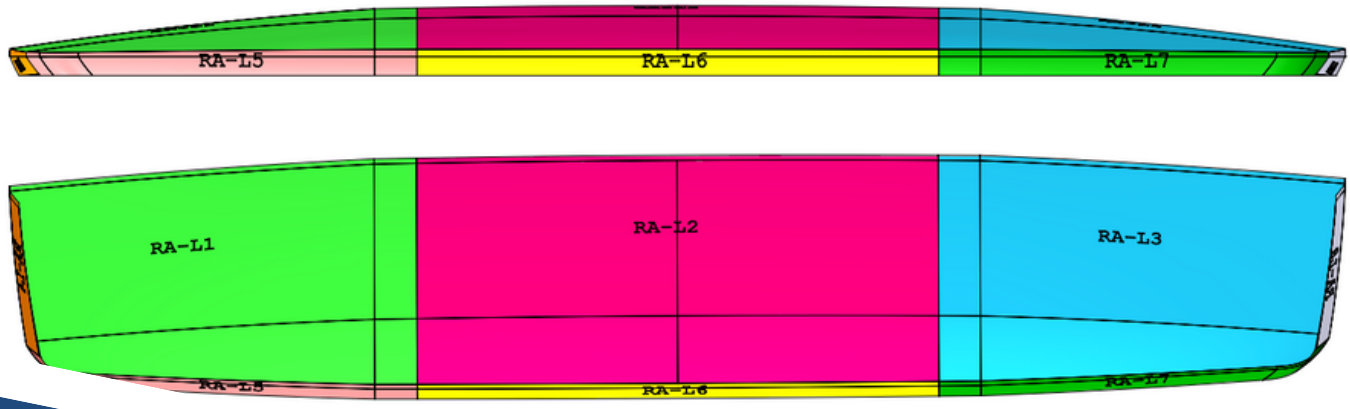
The structure-reinforcing 3D|CORE™ foam cores not only allow existing sandwich structures to be optimized. They enable the transformation of monolithic structures into optimized sandwich structures. Compared to other foam core systems, 3D|CORE™ develops significantly higher strengths. The successful re-engineering allows the sophisticated design of the LITORE|ONE® to be retained.

The day cruiser's multi-layered, monolithic GRP structure is replaced by cover layers of 600 gr. quadraxial glass fibre and a green 3D|CORE™ PET GR foam core. Our PET GR is made from recycled PET material. In combination with the 3D|CORE™ SURFACE gelcoat, this improves the technical properties and significantly reduces the weight. The high flexibility of our core materials in combination with the Fix-in-place™ ASSEMBLY KIT allow to follow the complex contours of the LITORE|ONE® mould. The optimized laminate plan, the use of our recycled foam material and the kit contribute significantly to the sustainability of the product and are a perfect complement to the Torqeedo® electric motor system.



☑ REDUCE WEIGHT

Thanks to the optimized laminate plan and the implementation of the 3D|CORE™ core material, we achieve weight and material saving of over 90 kg in deck and hull.



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3D|CORE™: THE SOLUTION

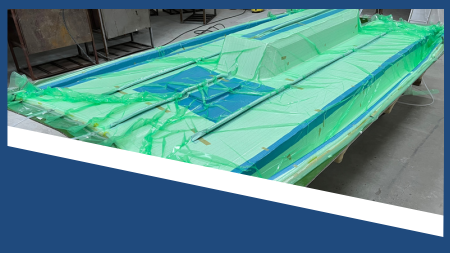
☑ REDUCE PRODUCTION TIME

The cuts of the Fix-in-place™ ASSEMBLY KIT, derived from the CAD drawing, simplify the insertion into the mould due to the lay-up plan and the labelling of the individual cuts. The flexibility of the foam cores allows fairly large cutting elements and this speeds up the work considerably.

Production time is significantly reduced with the use of Fix-in-place™ ASSEMBLY KITS, consisting of foam and fibreglass cuts. This is complemented by 3D|CORE™ SURFACE, which is sprayed on like a gelcoat. 3D|CORE™ SURFACE prevents the structure of the fibres and the honeycomb structure from becoming visible (print through) and thus saves the time-consuming reworking of the surfaces. This reduces the production time of the LITORE|ONE® by 50%.

☑ OPTIMIZE PRODUCTION PROCESS

With the conversion of the production process from hand laminate to vacuum infusion, additional saving potentials of production cost and working time are opened up for our customer. All certified production materials are supplied by us. The transport cost and thus the CO2 emissions are drastically reduced. As the system does not involve any waste at the customer's premises and the scrap is recycled in our factory, disposal expenses are eliminated. This economical process with reproducible components of consistent quality reduces the reject rate to an absolute minimum. The production process thus meets the requirements of the European Green Deal.



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3D|CORE™: THE SOLUTION

REDUCE COST

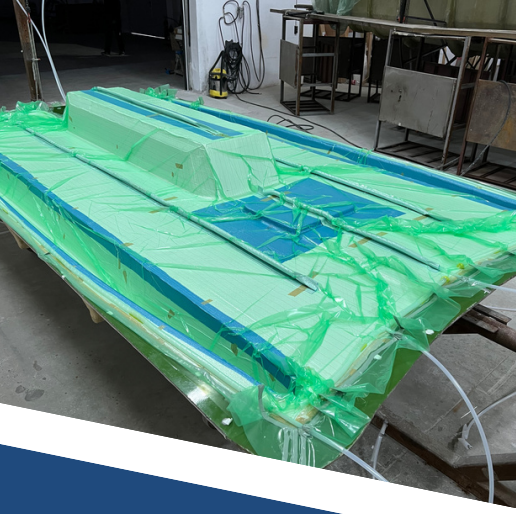
By using the 3D|CORE™ material, the expenses for glass fibre, resin and consumables are saved. As the patented 3D|CORE™ structure acts as an integrated flow aid, consumables such as a large-area venting mesh, the associated resin and peel ply can be dispensed with. The 3D|CORE™ SURFACE also saves on fleece and filler. The time saved with 3D|CORE™ and the vacuum assisted infusion method (VARTM) has a positive effect on LITORE®'s labour cost. In addition, the use of the 3D|CORE™ MARINE ASSEMBLY KITS eliminates disposal cost at the customer's site. The additional expenses for development are already amortized from the first component.

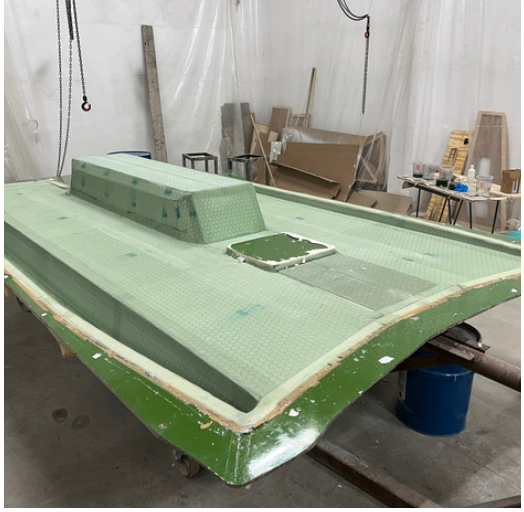
INCREASE EFFICIENCY

The weight saving in deck and hull creates a lower draught of the LITORE|ONE®. This results in significantly lower drag and increases the range of the day cruiser.

Working with 3D|CORE is a great experience with the primary goal of optimizing the product in many ways. In addition to the state-of-the-art production technology, the collaboration will advance the production of LITORE® and allow us to reduce our material consumption and cost. The joint effort between 3D|CORE and LITORE® sets new standards and is a necessary first step towards emission-free boating.

Aleksander Nemec
CEO - LITORE®





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3DICORE™: THE RESULT

LITORE | ONE	INITIAL SITUATION	TARGET	RESULT
WEIGHT	350 kg	290 kg	260 kg
PASSENGER CAPACITY	4 (+1)	5 (+1)	5 (+1)
MAX. SPEED	4.5 KNOTS	-	5 KNOTS
PRODUCTION TIME	9-10 DAYS	7 DAYS	4-5 DAYS

30% weight saving in deck and hull
from 290 kg to 200 kg

1/3 less material usage

90kg higher payload
from 4 (+1) to 5 (+1) passengers

100% process reliability
from hand laminate to vacuum infusion

50% time saving in production

Longer battery life

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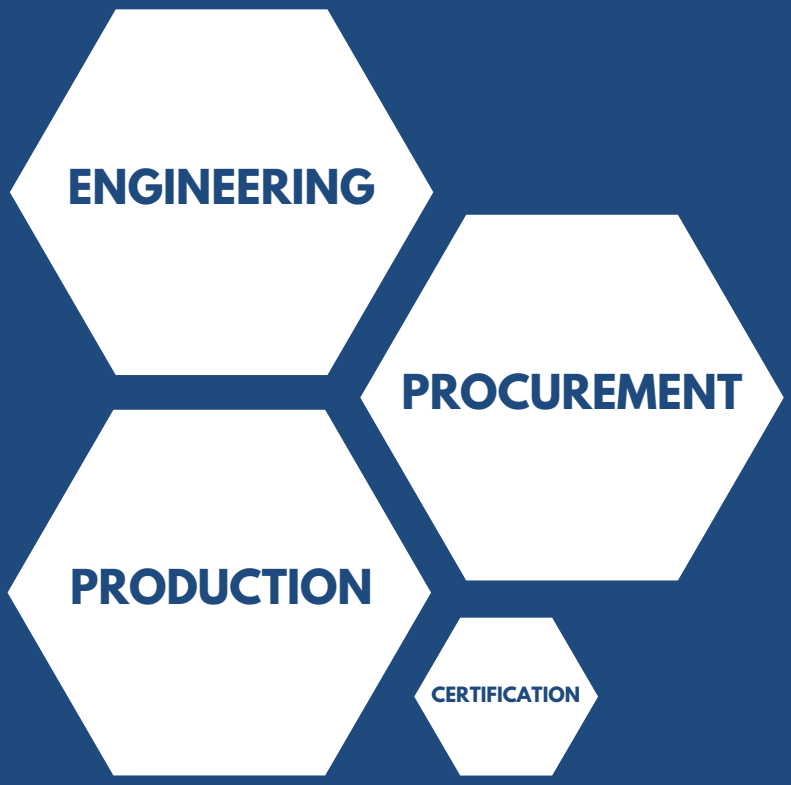

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