



## Rail Concept

The concept is to produce a pre-cast beam for quick-build for homes interior and exterior walls, floors and ceilings.

The precast beam is lock together parts with cast insulation, and pre formed vacuum bagged bubble pack conduit, Pex, and HVAC raceways. Simply poke to deflate and then remove plastic bubble pack to use, otherwise is highly insulated conduit channel/raceway/tunnels.

This reduces overall construction and finishing time by 90 percent, since the precast beams are pre-specified and continuous form cast at the factory.

Natural or synthetic skins may be applied for finish.

Hard point attach points can also be specified on center, for using wall hanging or attach points.

On a larger scale, this can be used for boat hulls or aircraft wings.

Updated 8/25/2021:

Use epoxy and carbon tow reinforced fiberglass batts for bubblepack fill. Flash expand, fill, and vacuum bag.

4/9/2024

## First Principles

Function over form. The objective of this strategy is to build a vessel like no other. The goal is lightweight, strong, efficient vessel which can be propelled mainly by solar PV energy. Instead of building on legacy technology this method of building boats is based by using efficient hydrodynamic hulls, and building above the water. The target waterline is less than two hundred feet, and an air draft of 18 ft (6 m), so the vessel can fit under any bridge and can transit the Rhine river up to Basel, Switzerland. The primary goal of the vessel is to act as a workboat platform, and also as a AirBNB yacht which can be used on the oceans, rivers, and European lakes. The configuration of the superstructure determines the end use of the craft, while the hulls remain essentially the same.

**Rail Hull Technology:** Similar to lots of component builds and commercial buildings (exterior skin support structure), this rail technology is for building maritime vessels. Multihulls are already some of the most efficient hydrodynamic craft, and this strategy evolves from that goal. In this case, the three hulls become rails to which the super structure is attached. This brings all mechanicals and living quarters above the waterline. There are no through-hull fittings, and no exposure to sinking from any hull breach. There is no bilge. The hulls have positive floatation. While there is some compromise of space by not going below the waterline, a huge amount of problems are averted.

**Modular Block Build:** Using a patented modular concept, use 1/8 plywood in 2 x 4 or 4 x 8 ft structural box components which are attached together. Inside box is weave of carbon fiber tow and bubble pack to provide positive flotation, even with a hull breach. Additional hard points (for attaching external structure) can be easily layered up on the inside of the block.

**Attaching Superstructure:** There are a number of strategies to attach superstructures (and decks) between the hulls. The most common would be a lug attach point (similar to aircraft wings) to the sides of the structurally enhanced blocks.

**Roll Formed Stainless:** Use of roll formed stainless steel for the exterior skin eliminates paint and any finishing. Similar to SpaceX design on their spacecraft (no paint, no excess weight).

**No Finishing:** This stainless steel skin concept pays for itself immediately in terms of painting and finishing costs. Typical hull preparation and paint costs on multihulls less than 50 ft. can run above \$10,000.

**Assembly:** Since modular blocks are laser engraved, assembly is easy. Similar to the housing industry using ICF (insulated concrete form blocks), this version can be stacked and assembled vertically or horizontally. Blocks are bonded together with fasteners and epoxy. Since each block is a watertight bulkhead, it is already a collision-sinking resistant.

**Transporting Modular Box Hull and Structure Components:** This concept allows shipping anywhere in the world via container freight. It also allows almost endless combinations of build vessel length and width.

**Production Replication:** The box beam modular construction also makes replication a production line and assembly process easier for small teams of builders. This process gives the advantage to customer builders and DIY owners.

**Robot Assembly:** Similar to loading container ships, modular blocks can easily be assembled and fastened (bonded) by automation. Think of a Tesla ship Gigafactory. The nature of using a standardized block, also lends itself to fabrication automation. Sheets of 4 x 8 ft. plywood can easily be laser scored and folded up into a box quickly. Spray foam or composite weaving could easily be deployed to make the module with positive floatation and vacuum bagged watertight.





---

---