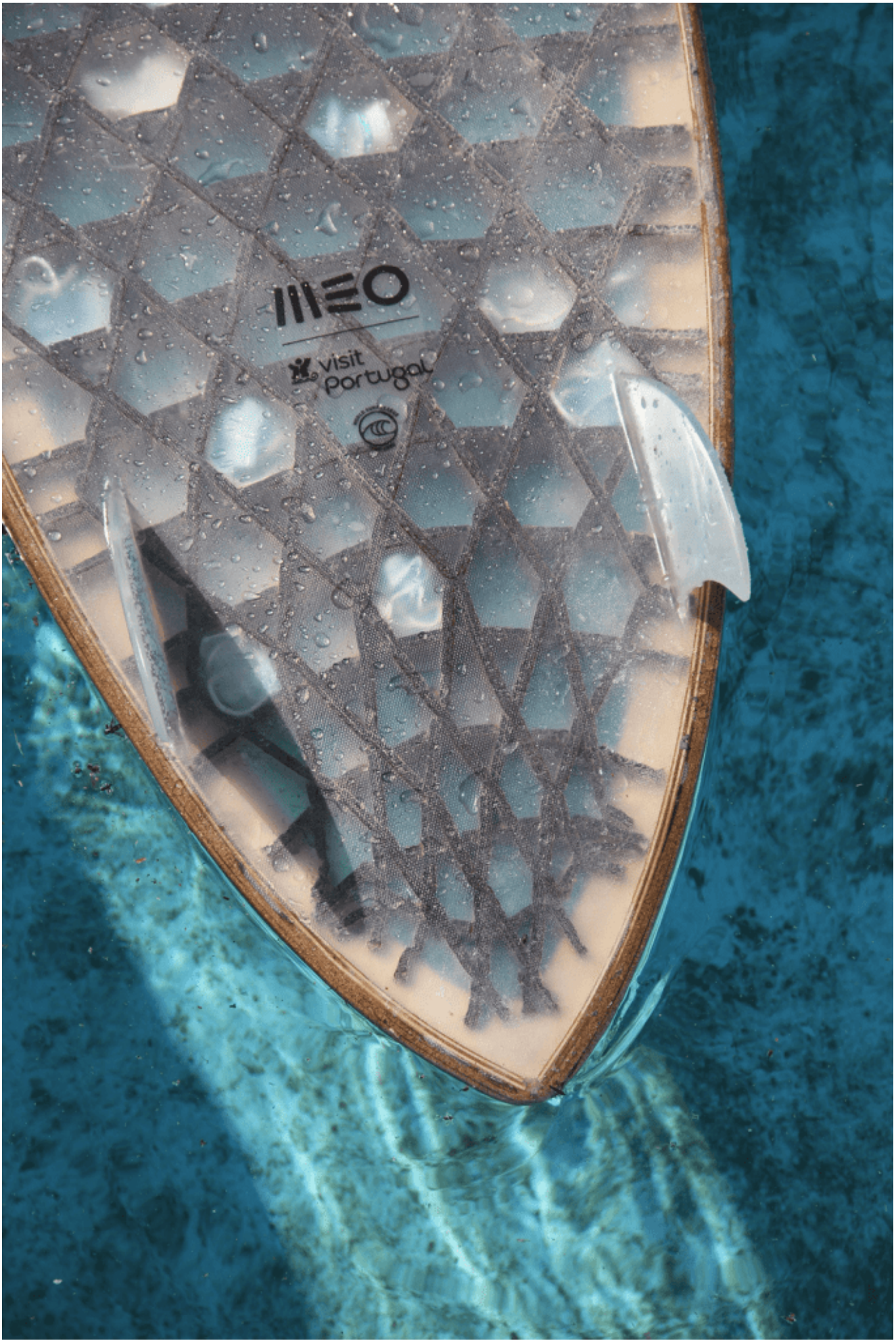
ShaperBay: A Browser-Based Platform for Custom Surfboard Design and Fabrication

ShaperBay is an innovative web-based platform that allows users to design, configure, and export custom surfboards directly from their browser. Built on a robust parametric engine and powered by Rhino and Grasshopper, it supports a range of fabrication methods, from CNC machining and 3D printing to hand shaping and hollow wooden construction.

At the system's core lies a powerful feature: the **Hollow Wood Structure (HWS) export**, which produces precise internal skeleton plans optimized for laser cutting and manual assembly. This tool has enabled surfboard makers around the world to create environmentally conscious boards with a high level of craftsmanship.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FROM DIGITAL DESIGN TO WOODEN WAVES

While ShaperBay accommodates multiple production techniques, its hollow wooden surfboard workflow stands out for its sustainable approach and hands-on appeal. Users can use the platform’s browser interface to define essential design parameters such as the board’s outline, rocker, volume, and frame geometry.

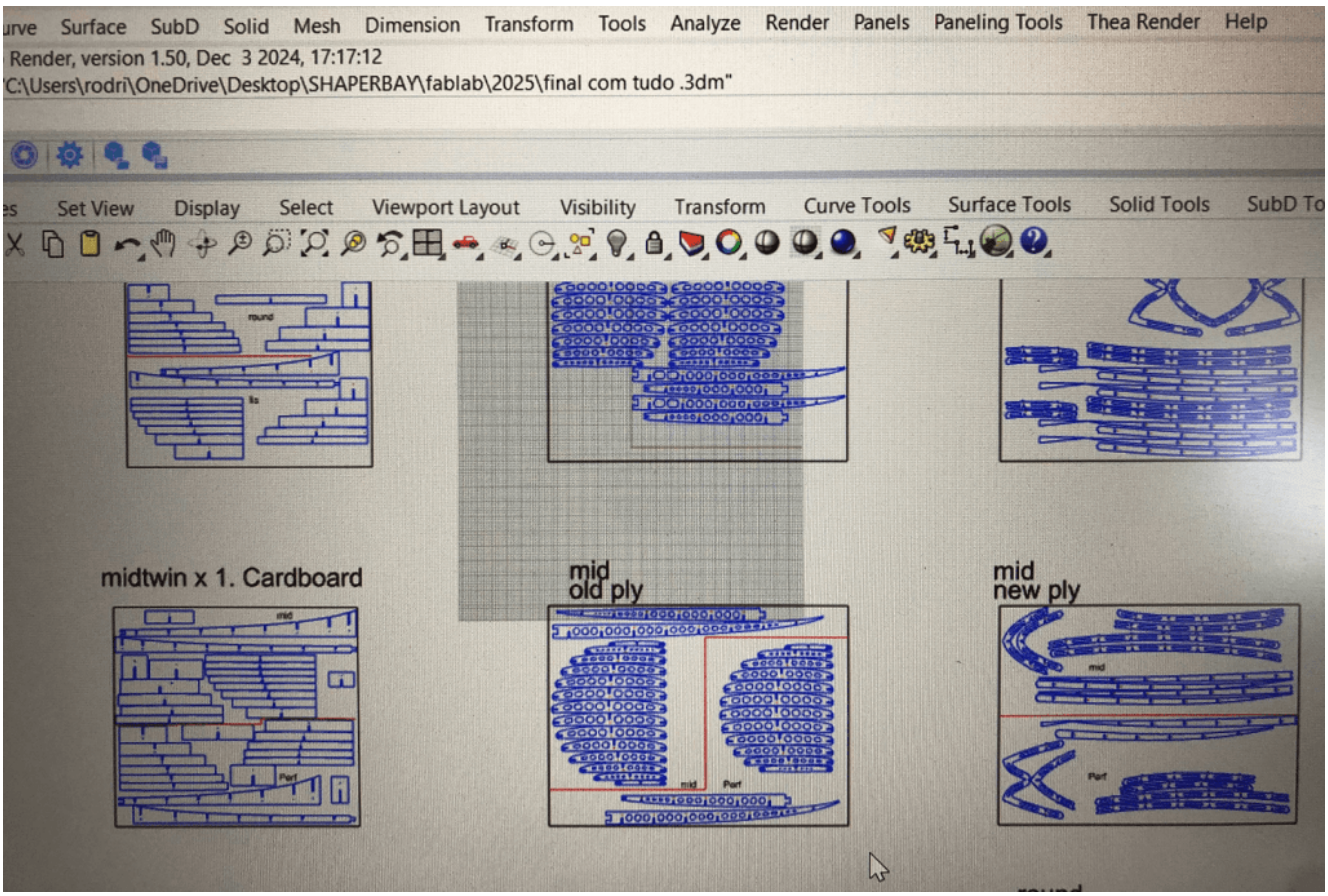
Once configured, ShaperBay generates:

- Interlocking spine and rib components, along with custom rail parts
- Rocker table templates for accurate assembly
- 2D outlines for shaping guides

The fabrication process may vary depending on user preferences and available materials. The platform’s HWS tab offers a variety of parameters to support different construction methods. For example, one possible workflow includes:

1. Laser-cutting the skeleton parts from wood
2. Assembling the internal frame
3. Applying wooden skins to the top and bottom
4. Adding and sculpting cork rails (optional)
5. Finishing with minimal fiberglass and epoxy

The final product is a lightweight, durable, and aesthetically unique surfboard, far more sustainable than traditional foam-based boards.



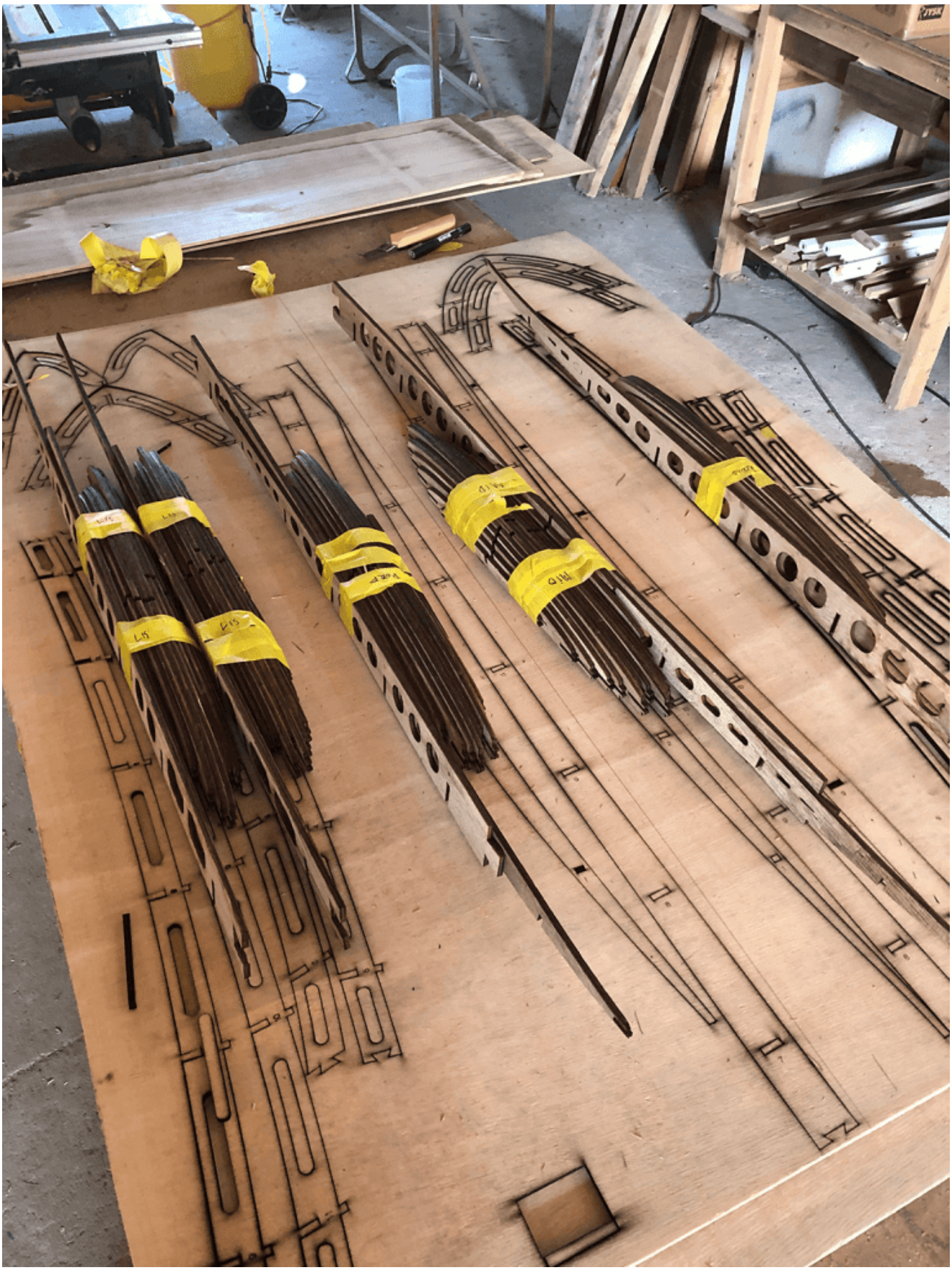
THE TECHNOLOGY BEHIND SHAPERBAY

ShaperBay is built using a custom Grasshopper definition that forms the foundation of its parametric model. This model, deployed to the web using [ShapeDiver], dynamically generates all geometry in response to user input. The entire surfboard, from outline to internal structure, is calculated in real time.

Key technologies include:

- **Rhino 3D**: Core modeling environment

- **Grasshopper**: Parametric logic and surfboard generation
- **ShapeDiver**: Web deployment framework
- **Pufferfish**: Curve interpolation and morphing
- **Squid**: 2D drawing generation and layered PDFs



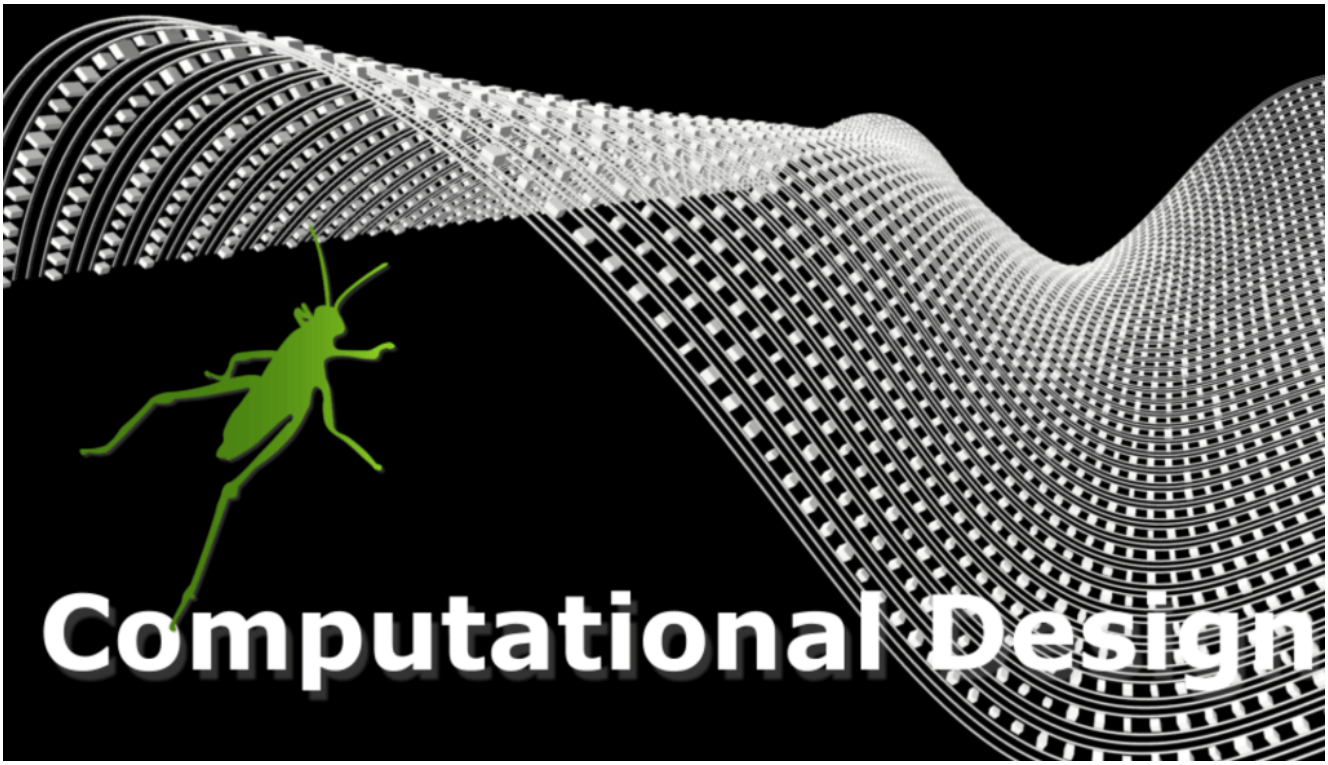
ShaperBay handles a variety of design parameters, including outline, rocker, foil, deck, bottom, and rail profiles. It also calculates structural balance, adjusts volume distribution, and produces files for both 3D visualization and manufacturing.

ADDRESSING TECHNICAL & UX CHALLENGES

Delivering a real-time, interactive experience inside a web browser came with performance constraints. To overcome this, the development prioritized:

- Lightweight mesh usage
- Point and transformation-based operations over heavier geometries
- Avoidance of complex intersections within the Grasshopper definition

Thanks to ShapeDiver’s AppBuilder, ShaperBay also offers an accessible and intuitive user interface, making advanced surfboard design approachable even for those without CAD experience.



See Also

COMPUTATIONAL DESIGN WITH GRASSHOPPER

SUSTAINABILITY & GLOBAL REACH

Most commercially available surfboards rely on petroleum-based polyurethane foam, fiberglass, and epoxy resins, materials that are difficult to recycle and degrade quickly. ShaperBay promotes an alternative: renewable wooden construction that requires less resin, generates less waste, and results in boards that are longer-lasting and easier to repair.

The HWS export feature makes this method practical and accurate, allowing users across the globe to build wooden surfboards using only a laser cutter and basic tools.

Today, ShaperBay is used by hobbyists, educators, and professional shapers in over **59 countries**. Dozens of boards have been built using HWS, CNC, or 3D print exports, supporting independent makers and surfboard builders with a tool that promotes sustainable, locally crafted solutions.

CREDITS

Rodrigo Aranha – Concept, development, design, and fabrication
ShapeDiver – Platform support and web-based deployment
Pufferfish & Squid – Critical plugin functionality
Rhino & Grasshopper – Core ecosystem powering parametric surfboard design
Partners – Including *FUNNER Surf Craft* and *SineSurf*, who have brought ShaperBay-generated boards to life