

Sustainability Report on Moss Research Surfboards: Eco-Stick 2011 Product Line

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Report on the sustainability of the Moss Research Eco-Stick for the 2011 year. This report includes a point-by-point review of the sustainability of the product line and company, as well as recommendations for further action.

This report was written by Tobias Schultz for the express use of Jake Moss and Moss Research. Its contents can be used, with credit, as Jake Moss sees fit.

The results of the sustainability evaluation are dependent upon information given by Moss Research to Tobias Schultz, and assumes their contents are fully truthful and correct.



Result on Endorsement Application:

Gold Endorsement Confirmed

The Eco-Stick's design, as well as the company performance of Moss Research, shows a high level of commitment to performance, and awareness concerning sustainability.

1. Scope: This report applies to the line of the Moss Research Eco-Stick, for the 2011 calendar year. Its results are based on the environmental, social, financial, and surfing performance of a 6'0" shortboard, provided by Moss Research at the beginning of 2011, and can be taken as representative for surfboards in the "shortboard" range, 6'6" and below, and designed with a thruster (three-fin) set up. It assumes that all boards in the Eco-Stick line, while varying in shape and size, are composed of the same materials and shaped in the same facility, and that there will be no significant variations in their design in the 2011 year.

1.1 Benchmark Product: The Eco-Stick is compared against a benchmark product, which is a polyurethane-core foam surfboard, laminated with unsaturated polyester resin and methyl ethyl ketone peroxide (MEKP) catalyst, with fiberglass as the structural component of the laminating process (two layers of glass on the top deck, one on the bottom). The benchmark product utilizes a wooden stringer.

The benchmark is a surfboard with shortboard dimensions (6'6" or below), and thruster fin setup, manufactured regionally (in this case, in the state of California). This reflects the market reality of surfboard production (roughly 85% of the market is polyurethane core surfboards), as well as the historical reality of the surfboard manufacturing industry, which is regionally based.

2. Sustainable Surfboard Design Standards

The performance of the Eco-Stick according to twelve key sustainability metrics is evaluated against the benchmark product. These metrics cross the three realms of sustainability; environmental, social, and financial, and consider the unique needs and concerns for sustainability in the surf world.

These twelve performance metrics are based upon the Sustainable Surfboard Design Standards, a collaborative set of sustainability guidelines available for comment at the Sustainable Surfing Coalition website. The Standards are qualitative set of guidelines, based on inferences from studies in quantitative life cycle assessment, and take into account feedback from stakeholders in and outside of the surf industry. The Standards are a "live" set, open to iteration and variation as new data are obtained, and as the industry itself changes. The 2011 Endorsement presented here will remain valid, regardless of changes to the Standard. The results here are based upon the Standards as they are defined on February 20, 2011.

3. Comments

3.1 Sustainability Benefits: The Eco-Stick line utilizes materials which can be inferred from comparisons with quantitative life cycle assessments to have lowered environmental impacts in the supply chain. The boards utilize materials manufactured domestically; this maintains support for an industry that has traditionally been domestically based, preventing the outsourcing of both jobs and wealth. The use of domestic materials reduces environmental impacts associated with unregulated manufacturing processes in high-pollution economies such as China, Thailand, and Brazil, and reduces transportation impacts.

Moss Research has been proactive in community engagement and coastal protection, especially considering the small size of the company. This is a vital element of social sustainability for any company.

3.2 In Summary: The Moss Research Eco-Stick should be considered an industry leader in the realm of green surfboard design. Its materials and processes are an exemplar, not just for small companies but for large ones, as well.

4. Results: Product Line Criteria

The first six guidelines apply directly to the 2011 Eco-Stick product line, as defined in the Scope section.

4.1 Board Performance: Excellent Rating

The 6'0" shortboard provided is an excellent high performance board, cutting edge in terms of tailored performance. It was designed for conditions found in Ocean Beach, California, in mind for powerful, barreling surf; the shape of the board, including its forward center of gravity, allows for early entry into this type of heavy surf. The shape of its tail also allows for small but controlled movements in heavy conditions, while the rocker along the stringer allows for a board capable of very fast acceleration. The board surfs well regardless of footing position, which is essential when moving back and forth on the board, moving between forward, barrel-riding position, and further back footing suitable for turns.

The foam used in the board construction is lightweight, allowing for easy paddling and aerials. The resin used is lightweight but flexible.

The resin and foam combination makes for a board which is very responsive, and a vibration pattern which is slower than conventional polyurethane, and significantly slower than conventional epoxy/EPS construction. This makes for a board which does not have the "jerky", over-responsive feel of many epoxy/EPS boards, while maintaining the lightweight properties of the material.

The board's "stiffness" is more akin to polyester/polyurethane core surfboards than epoxy/EPS. This makes for a nose-to-tail flex pattern that is not overly stiff, as in many EPS boards, allowing for long arc, "power" turns.

The flex pattern and responsiveness of resin and foam, along with the shape of the deck, means that flex across the deck, from rail to rail, is controllable. This allows for much more controlled "check" turns. This is a unique feature of this surfboard, as most are too stiff between rail to rail to allow for controlled flexing in this direction.

4.2 Craftsmanship & Durability: Good Rating

The surfboard must go through a full season of surf to get a full sense of its durability performance; however, visual inspection, and test evaluations in wintertime northern California conditions (including barreling surf up to 12 foot on the face), has evaluated its durability sufficiently to come to conclusions on its performance. The board has survived many heavy duck dives in these conditions without buckling, a key test of board durability.

Inspection of board construction shows ample use of resin. The wrapped rails insure strength without a large amount of added weight. EPS foam of the density is used is more durable than polyurethane, as its resistance to pressure dings will prevent increased incidences of delamination.

4.3 Domestic Supply Chain: Excellent Rating

The full Tier 1 of the supply chain for the Eco-Stick has been examined; all of the major components are manufactured in the U.S. Marko Foam and Resin Research are based in California, while Excel fiberglass is based in Florida.

4.4 Use of Low-Impact Materials: Excellent Rating

Entropy Resin and Marko Foam's E-Blanks are the top of their industry, in terms of lowering environmental impact.

4.4.1 Foam Blank: The foam blank used in the Eco-Stick (Marko Foam's E-Foam) is a market leader in terms of environmental impact. Research in this area has shown that the recycled foam used in this product has a lower carbon footprint than a virgin EPS blank.¹

Virgin EPS has a somewhat smaller carbon footprint than the benchmark product, a surfboard with a polyurethane foam core. The recycled EPS therefore can be expected to have a much reduced carbon footprint. It also re-utilizes solid waste from packaging, therefore diverting it from a landfill.

Another key impact of concern is the use of toxic chemicals in production; while virgin EPS is not superior than polyurethane in this regard, recycled EPS almost certainly reduces toxic emissions, and hazardous exposures to workers. More research is encouraged in this area.

4.4.2 Resin and Hardener: The health and toxicity effects of Entropy Super Sap Resin and Hardener are less than the industry leader epoxy resin (Resin Research); and significantly better than conventional polyester resin and MEKP catalyst. The Entropy Super Sap Resin used in the Eco-Stick has limited respiratory health effects, and is considered a sensitizer. The resin/hardener combination has moderate environmental toxicity effects; this is not expected to be of appreciable concern, so long as excess resin is disposed of properly.

Entropy Resin uses tall oil and other re-utilized agricultural by-products in its manufacture. This indicates a lowered carbon footprint than conventional polyester and epoxy resins. It is encouraged that Moss Research consult with Entropy Resins, as the company is pursuing a quantitative life cycle assessment to demonstrate its environmental performance. The results of this study could show conclusively that the product has a lowered environmental footprint, in terms of carbon and other important impacts.

Recommendations: Take great care that excess resin and hardener are disposed of safely, according to data found in the MSDS for the associated products. This includes recycling of the product container; excess resin and hardener should be disposed of with a licensed contractor, rather than simply landfilled. This product is not a hazardous material, in contrast to typical Resin Research or Silmar 249A polyester resin, and so disposal is of much less concern.

4.5 Minimizing health effects towards workers: Excellent Rating

As more fully described in Criterion #4, the Entropy Resin and Hardener offer improvements to worker health and safety in the shaping room, when compared to conventional epoxy resin. When compared to conventional polyester resin and MEKP catalyst, the health benefits are dramatic.

The use of recycled E-foam also diminishes the hot spot of benzene production, which is necessary to produce styrene, required for virgin expanded polystyrene. Benzene is extremely toxic.

The use of solvents (such as acetone) in shared shaping facility are of concern. Respiratory problems with acetone are an issue, though not a large concern provided proper protection is used; the flammability of acetone is more of an issue, as the chemical is considered volatile and highly flammable. Please consult MSDS on acetone for more information.

Recommendations: Breathing protection is strongly recommended for use during glassing and lamination, due to the toxic effects of the resin, hardener, solvents, and glassing dust. Care when using acetone to prevent a fire hazard is also of large concern, as a combustible amount can enter the air if the acetone is left uncovered at room temperature. Experimentation with alternative solvents, with lesser toxic effects, is also suggested.

4.6 Use of renewable energy: Pass Rating

Purchase of California electricity is a baseline, but improvements can be made.

Discussions with Moss Research have suggested that an investment in renewable energy may soon occur. The company's purchase of California electricity actually includes the purchase of renewable energy, as the state has a stringent Renewable Energy Portfolio Standard.ⁱⁱ

Recommendations: The company does not in fact own its own production facilities, leading to difficulties in direct investment in renewable energy. It is suggested that Moss Research investigate purchasing "green" energy from its utility provider, as many electricity companies offer packages where money spent can be invested in renewable energy projects.

5. Results: Company Performance

Performance in these six guidelines highlights the importance of company actions, which are a vital component of sustainable practice.

5.1 Community/social engagement, and contributions to non-profits and charity: Excellent Rating

The company's work with non-profits Rerip is excellent, as well as its dedication to the education of the surfing public. The company also plans to unveil a website which can offer a communication venue for surfers interested in sustainability. Moss Research has done well in this area, especially given the limited resources available to the small company.

5.2 Participation in Coastal Environmental Protection: Good Rating

Given Moss Research's constraints and commitment, the company receives a Good rating.

Moss Research has been participating with the Action H2O Coalition (working with U Grow Organics), and is a Co-Founder of the Sustainable Surfing Coalition.

Though many efforts of these organizations have yet to come to full fruition, Moss Research has showed a high level of commitment to these causes. Given the small company's time and financial constraints, they have done quite well.

5.3 Research into Sustainability Performance: Excellent Rating

An industry leader in sustainable research.

Moss Research has actively identified and researched products which deserve high sustainability ratings, and has explored many options for sustainability in the environmental, financial, and social realms.

Recommendations: Researching into life cycle assessments on the materials going in to the Eco-Stick and associated products should be an eventual goal for Moss Research, which could also include obtaining quantitative certifications from trusted companies. For now, very few other surfboard companies have attempted even a basic degree of research; even “green” board vendors do not typically invest time in actually analyzing their products. Moss Research stands out as an industry leader in this regard.

5.4 Research into Sustainability Performance: Excellent Rating

Moss Research has actively experimented with alternative materials and board shapes, and is willing to take risks in identifying truly next-generation board designs.

5.5 Transparency and Readiness to Adapt: Excellent Rating

Moss Research has demonstrated a dedication towards an honest evaluation of its environmental performance, and a willingness to adapt its methods. Many companies get locked in on products which claim to be sustainable, even when later evidence shows that this is not the case.

5.6 Financial Solvency: Good Rating

Moss Research has weathered an economic downturn, and is looking forward to large expansion in several areas. Geographically, the company is seeking to expand to parts of California outside of its hinterland of southern California; it has also reached out to professional surfboard riders to build up its reputation as a company producing high-performance boards. The marketing campaign has also resulted in a high level of desire for the surfboards in question.

- i The Alliance of Foam Packaging Recyclers (AFPR) conducted an EPS Life Cycle Analysis Report which suggests that recycled EPS, 20% by content, will result in a 9% reduction in carbon footprint, when compared to virgin EPS. This report is not ISO 14044 certified, however, and the validity of its results could not be verified. The report is accessible at : http://www.epspackaging.org/index.php?option=com_content&view=article&id=21&Itemid=18

- ii The California Renewables Portfolio Standard (RPS) required electric corporations to increase procurement from eligible renewable energy resources by at least 1% of their retail sales annually, until they reached 20% by 2010, with a further goal of 33% renewable energy by 2020. The 20% threshold in 2010 was missed, with the three main electricity providers in California obtaining only 15% of their retail electricity sales with renewable energy in 2009. While these deadlines were missed, the Californian economy is still on track to expand its renewable energy component dramatically over the next decade, especially with the increasing use of solar power. With coming improvements in technology, it is in feasible that California will reach the 33% threshold in 2020. Also note that California has one of the most stringent RPS in the United States, and that the only economies in the world with higher percentages of renewable electricity are in Europe (especially Germany and nearby countries). Read more at the California RPS website: <http://www.cpuc.ca.gov/PUC/energy/Renewables/>