

Reinventing Circularity through upcycling oceanic litter into building materials.

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JCCME 2023

International Joint Conference on
Civil and Marine Engineering



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Lígia Barcellos - School of Engineering, Textile Engineering Department

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Artur Mateus

Ana Peixinho

Marco Coutinho

CVR – Centre for Waste Valorization, Guimaraes, Portugal



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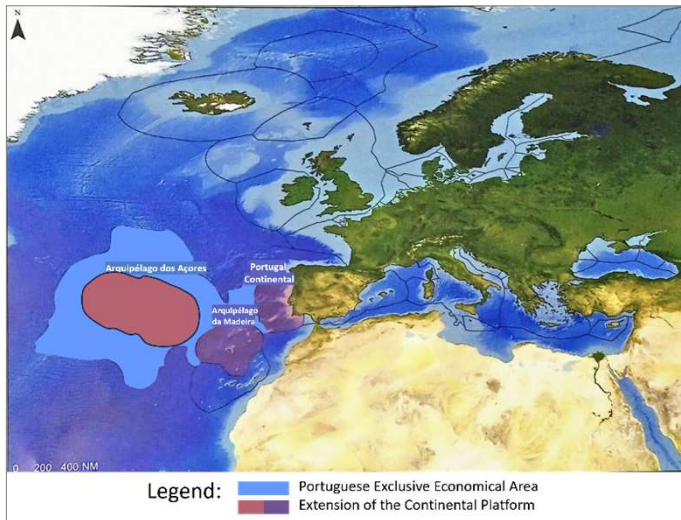
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Case study area

The Portuguese Exclusive Economic Zone (EEZ) comprises 3 subareas:

- the mainland subarea (287,521 km²),
- the Madeira subarea (442,248 km²)
- and the Azores subarea (930,687 km²)



R.S. Ribeiro: Oceans, Infinite Blue, Public Library and Regional Archive Luís da Silva Ribeiro – ISBN: 978-989-54455-6-1, Angra do Heroísmo (2023) (in portuguese).

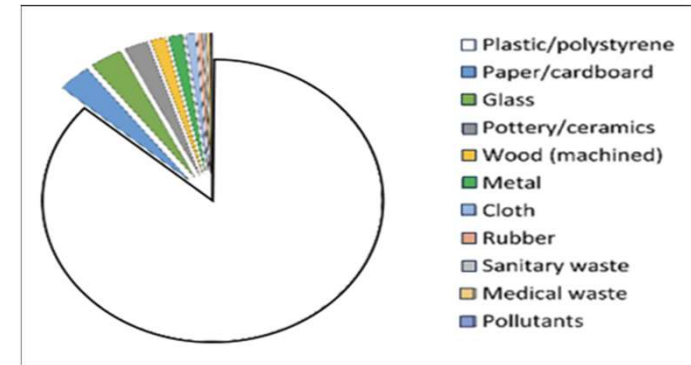
The Azores Archipelago has 844km of coastal strip and is made up of nine islands, divided into three groups:

- Western (Flores and Corvo),
- Central (Terceira, Graciosa, Pico, São Jorge and Faial)
- and Eastern (São Miguel and Santa Maria).



<https://geology.com/world/azores-satellite-image.shtml>

Composition of waste items collected in the Azores



Ríos, N., Frias, J. P., Rodríguez, Y., Carriço, R., Garcia, S. M., Juliano, M., & Pham, C. K. (2018). Spatio-temporal variability of beached macro-litter on remote islands of the North Atlantic. *Marine pollution Bulletin*, 133, 304-311.



Waste collection, separation and characterization

- Collection of wastes (over 20 tonnes till now) collected in the sea, beaches and ports of Azores.



- The sample was separated by type, such as fishing nets, fishing lines and different types of ropes and cables



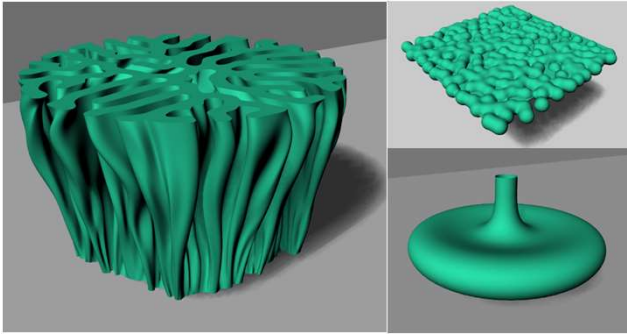
- To identify the material, an analysis was carried out using Fourier-Transform Infrared Spectroscopy (FTIR), which measures the absorption of infrared radiation by the sample material versus wavelength. The polymer identified for the mooring cables was High Density Polyethylene (HDPE).



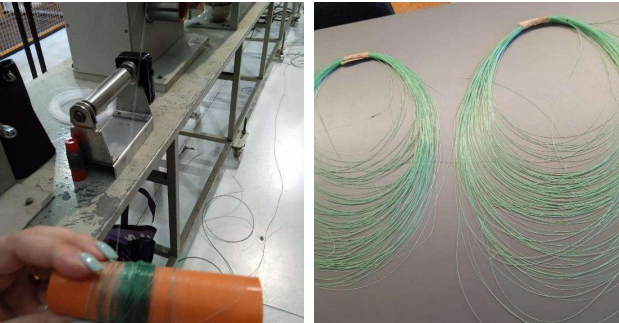
- Greater focus was given to the material coming from the mooring cables of fishing vessels, due to its high volume and evaluation as a source of material for textile structures and building construction systems;



Waste treatment and recycling



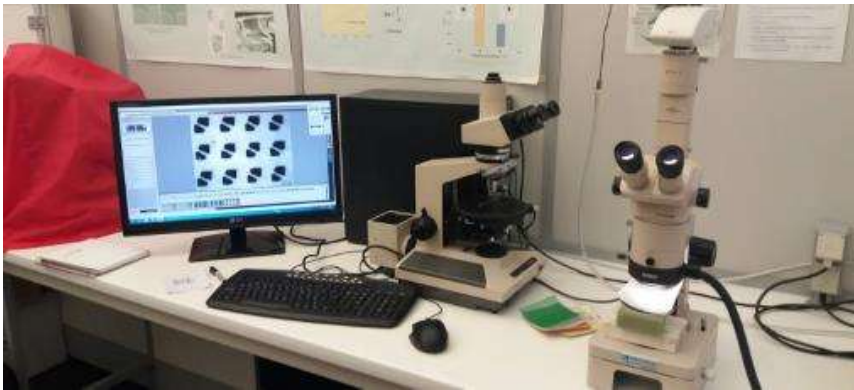
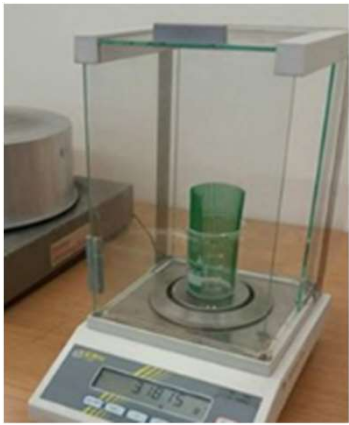
Test models to 3D print using Recycled oceanic plastic



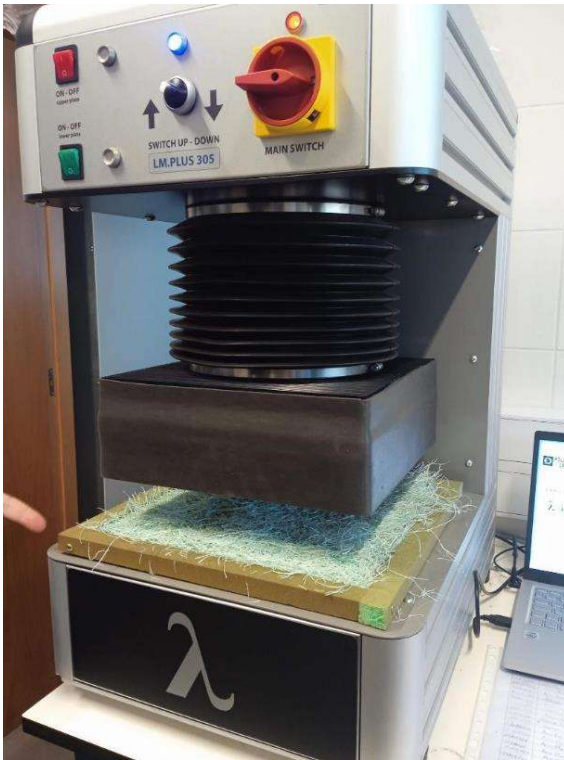
Home Textiles by Nieta Atelier



Laboratorial tests carried out in University of Minho Textile Engineering Department



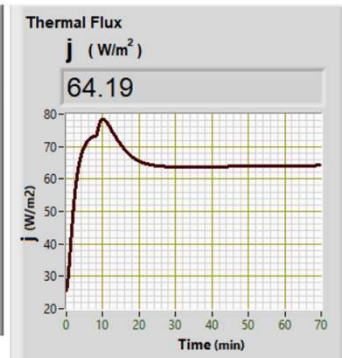
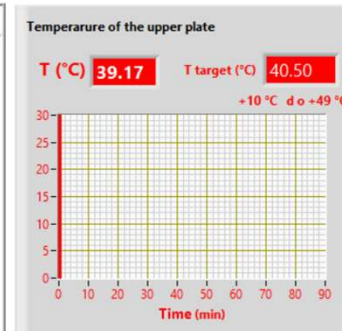
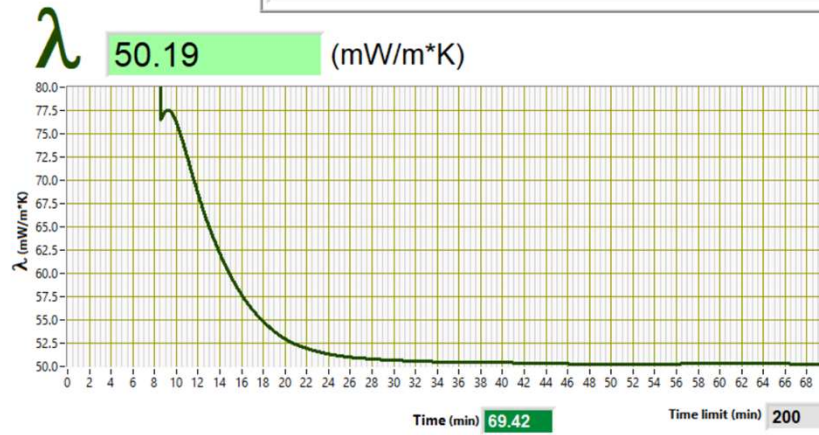
Laboratorial tests carried out in Center for Rapid and Sustainable Product Development, IP- Leiria.



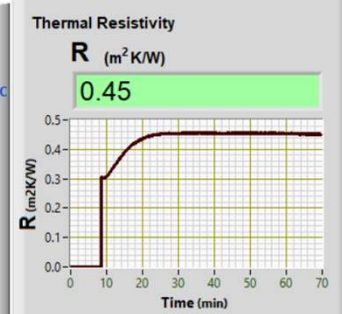
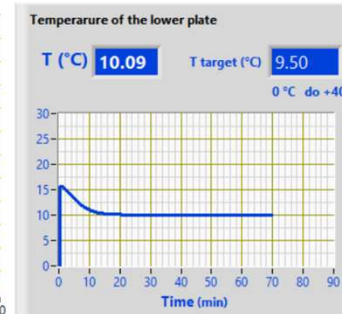
ISO 8301

Date and time:
04/08/2023 15:46:51

Sample code	Ident:
Fibras(+)	
Length (mm): 305.0	Nominal thickness (mm): 50.0
Width (mm): 305.0	
Mass (g): 273.0	Tested by: Ana
Thickness (mm): 22.6	
Density (kg/m ³): 129.7	
Note:	



ΔT: 29.08 (°C) Tmean: 24.63 (°C)

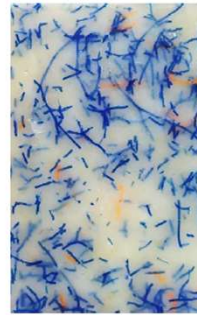


Save to database and Exit k (W/m2, mV)

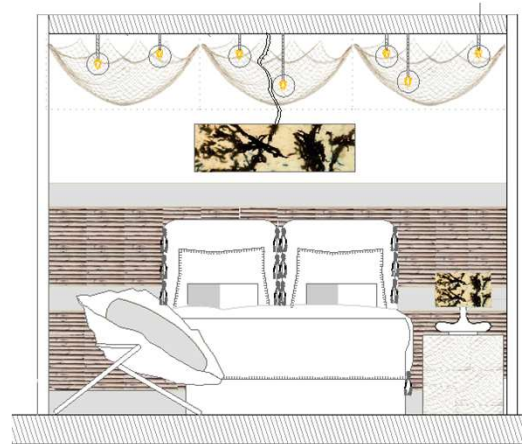


Development of a translucent panel from polyamide fishing wires and algae

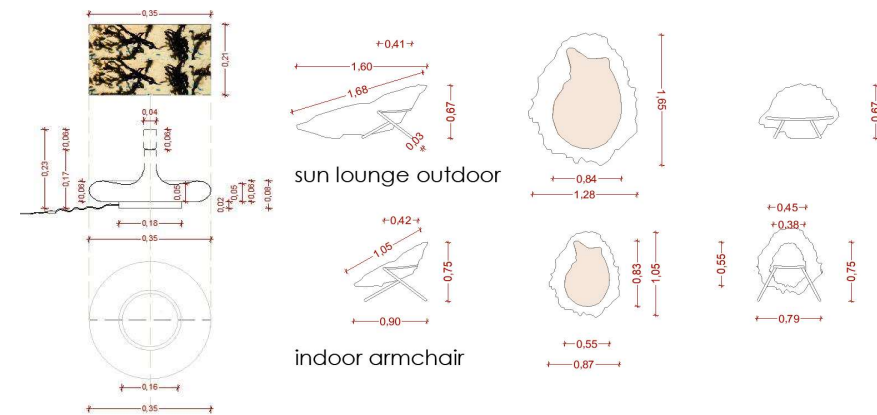
Catarina Ribeiro, MSc student



ecoproducts – AZORES ECOBLIE



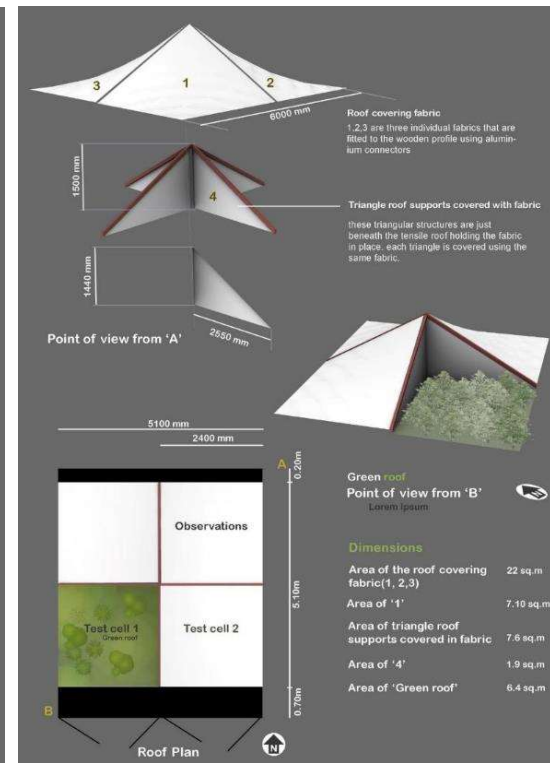
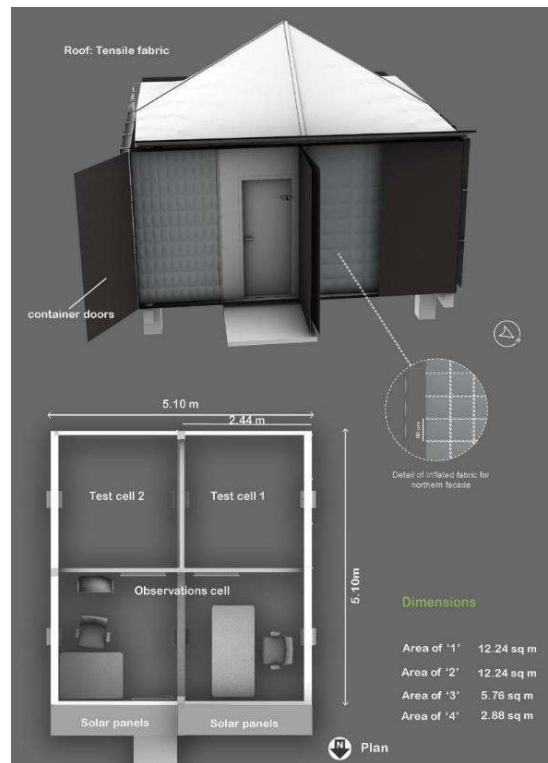
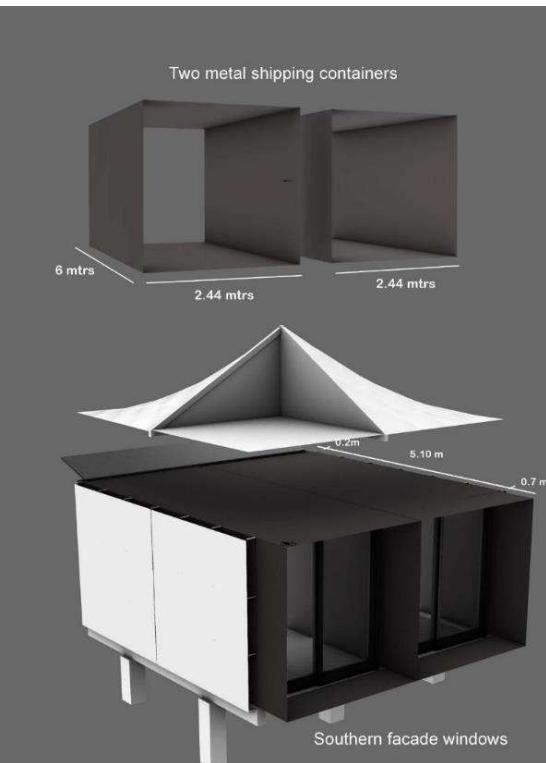
Algae lamps and "patella chair" by Nieta Atelier



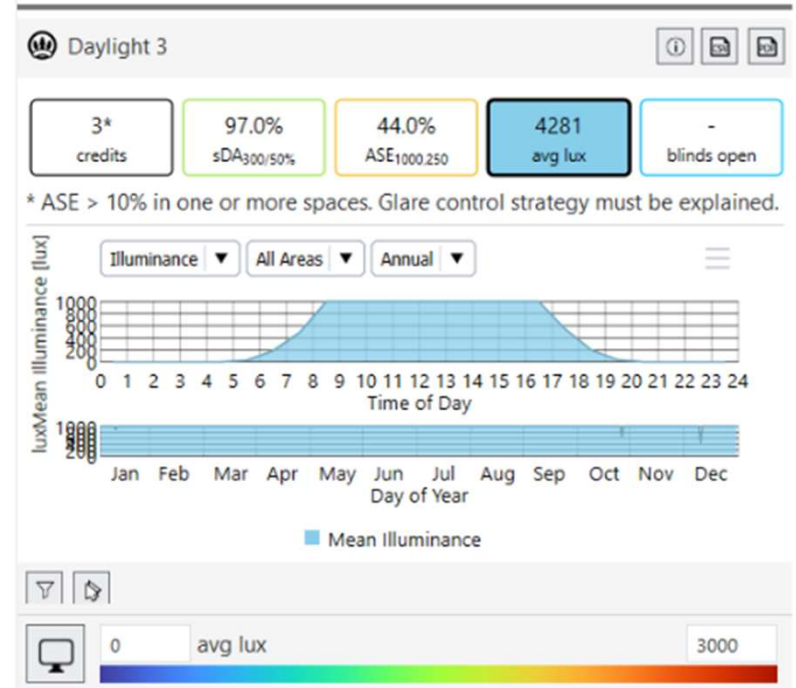
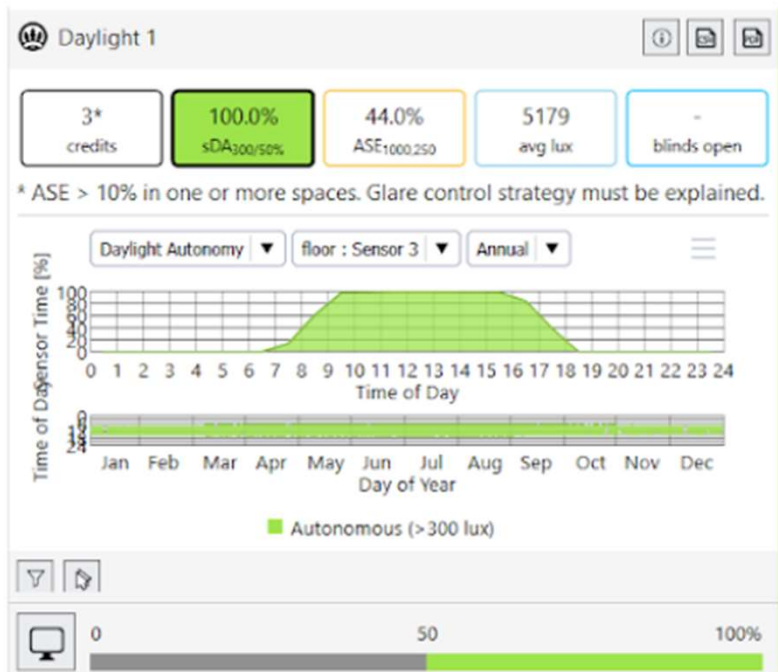
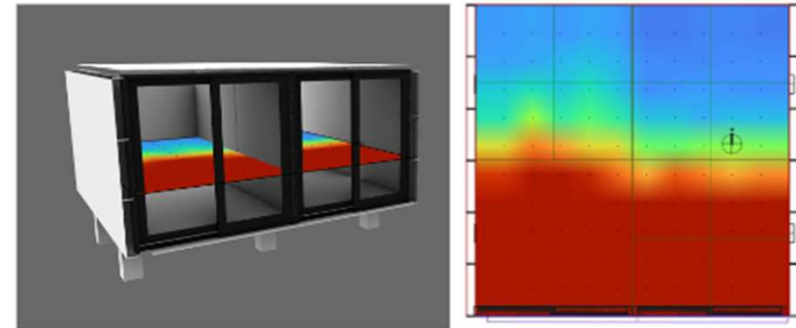
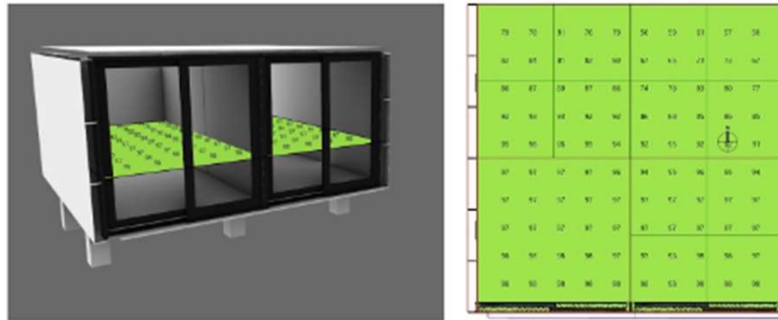
Equipment available in Uminho School of Architecture, Art and Design for In-situ tests to be carried out in situ and in Test Cells



Test Cells under construction in Terceira Island, Azores



Daylight Simulations for Test cells

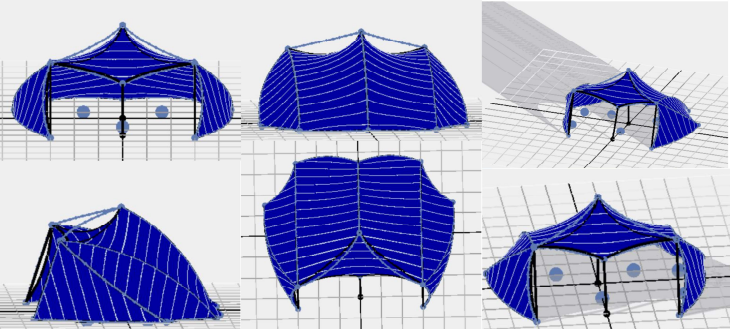


Proposals for fishermen shelters for São Mateus village port done by students on the Curricular Unit Ephemeral Installations with reused materials, 2022/2023

Coordinator: Paulo Mendonça

Instalações Efêmeras com Materiais Reutilizados-Entrega Final-03/01/2023
 Francisco Rodrigues - A91039
 João Gonçalves - A90262
 João Machado - A10414
 José Mendes - A81581
 Rodrigo Correia - A12430

Estrutura de apoio a pescadores/artesãos



Uma estrutura efêmera de apoio a artesãos é um projeto ou iniciativa que tem como objetivo ajudar artesãos a desenvolver e promover suas habilidades e trabalhos. Isso pode incluir a disponibilização de espaço de trabalho, acesso a ferramentas e equipamentos, etc.
 A ideia é fornecer aos artesãos os recursos necessários para que eles possam se estabelecer e ter sucesso nos seus negócios.
 O nosso objetivo com este projeto é, através da construção efêmera com materiais reutilizados, prestar apoio a pescadores/artesãos da freguesia de São Mateus da Calheta, na Ilha Terceira, Açores, com uma cobertura.



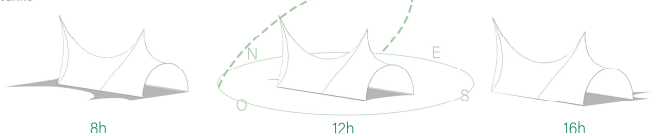
Estrutura efêmera modular

Apoio a pescadores / apoio a artesãos / oficina para triagem de resíduos

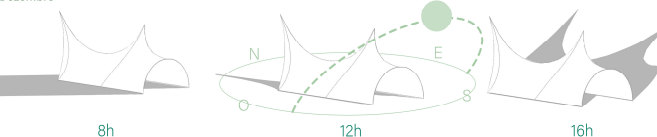
1001.23 Opção UMinho - Instalações Efêmeras com Materiais Reutilizados

Anais Pinto A88513 | Andreia Madaleno A91882 | Beatriz Pires A91636 | Delcy Mascarenhas A93951 | Inês Gomes A96742

Junho



Dezembro



São Mateus da Calheta, Ilha Terceira, Açores



LOCAL DE INTERESSE

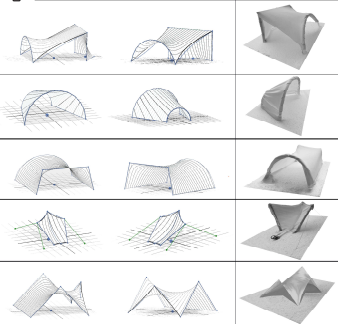


Freguesia de São Mateus da Calheta, na Terceira, Açores
 O local do projeto está localizado dentro do porto da Freguesia de São Mateus da Calheta em Terceira. A área tem uma forma curva e é delimitada de um lado por uma parede e do outro pelo mar. O muro segue o percurso pedonal de rua, que se encurva numa curva suave.
 O projeto consiste na construção de uma cobertura para o percurso pedonal, uma estrutura modular que terá o papel de criar sombra e proteger os transeuntes de outros agentes atmosféricos.

M. EMBRANA



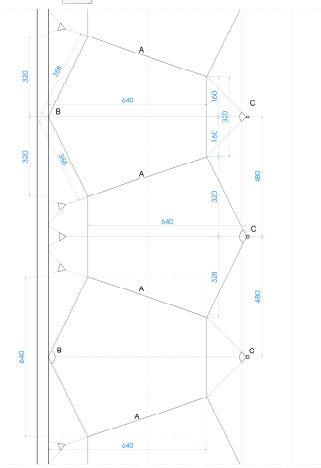
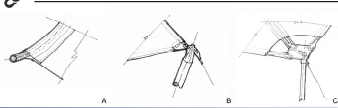
IDEIAS INICIAIS



CARACTERÍSTICAS MATERIAS

- Material ecológico
- Estiloso
- Têxtil
- Leve
- Proteção eólica
- Proteção UV
- À prova d'água
- Resistente ao vento
- Facilmente reparável
- Resistente ao fogo

DETALHES DA CONEXÃO



Opção UMinho - Instalações Efêmeras com Materiais Reutilizados

Ano escolar: 2022/2023
 Coordenador: Paulo Mendonça - mendonca@esad.uminho.pt

Giorgina Benedito - E10018
 Beatriz Fernandes - A86384
 Manuel Mourão - A83096
 Igor Emanuel Pinheiro Cunha - A101145
 Karolina Tróica - E10044



Proposals for fishermen shelters for São Mateus village port done by Azores EcoBlue team, 2023

Coordinator: Paulo Mendonça



Fisherman shelter proposal for São Mateus village port v1

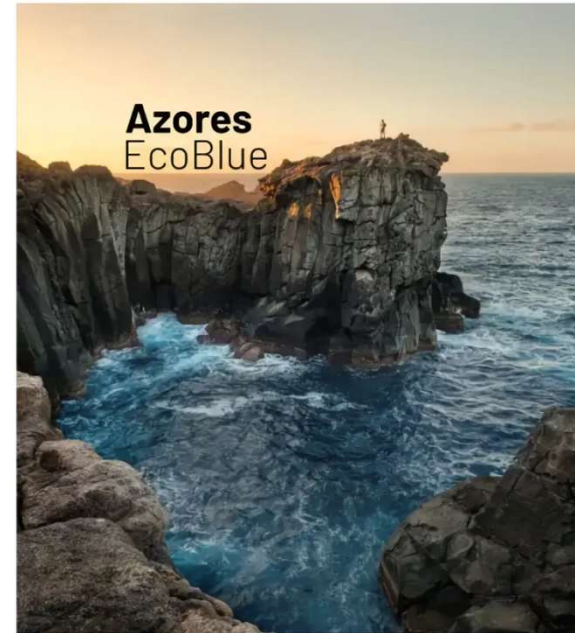


Fisherman shelter proposal for São Mateus village port v2



Thank You

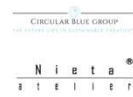
Financed by:



Program Operator:



Promoter:



Partners:



Universidade do Minho



E-mail: mendonca@eaaad.uminho.pt