

The project

Aim of the project is the creation of an industrial demonstrator prototype for the manufacture of innovative building components (panels, shaped, load-bearing, LEGO type blocks, etc.), meeting the structural, eco-friendly, thermal and acoustic requirements for green building. The products will be made, starting from composites in natural fibers, through the use of innovative and low cost 3D technologies.



Contacts

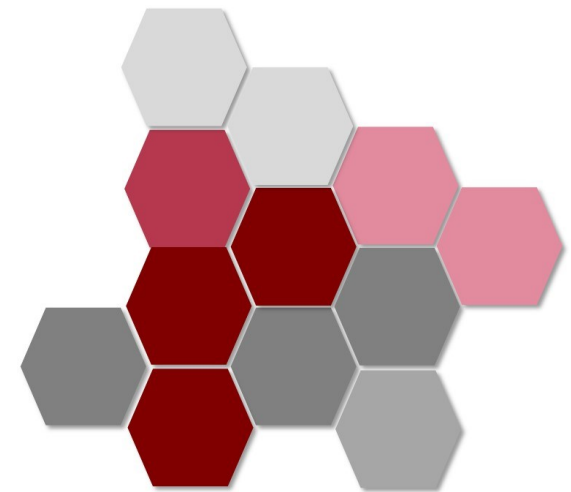
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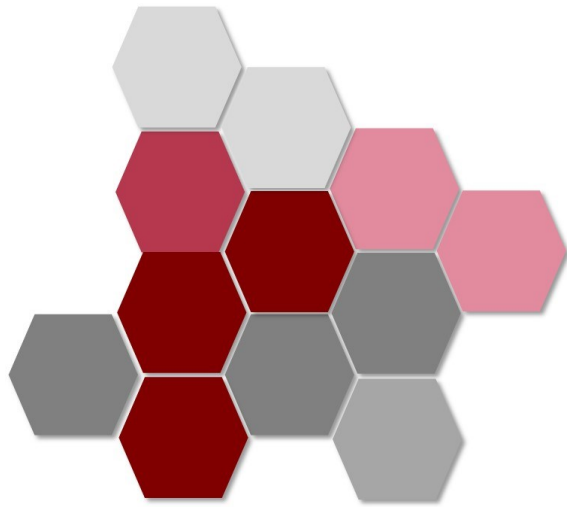
3D BIOCOMED

Development in 3D of biocomposites for building industry



Funded by: POR CALABRIA FESR-FSE 2014-2020
ASSE I – Promozione della Ricerca Scientifica e dell'Innovazione
Obiettivo specifico 1.2 "Rafforzamento del sistema innovativo regionale e nazionale"
Azione 1.2.2 "Supporto alla realizzazione di progetti complessi di attività di ricerca e sviluppo su poche aree tematiche di rilievo e all'applicazione di soluzioni tecnologiche funzionali alla realizzazione delle





Expected results

- ▶ Preparation of formulations of epoxy and polyurethane **composites, based on functionalised natural fibres** and other additives, which are able to confer important properties for applications in green building; they must also be printable through a 3D printing process.
- ▶ Realization of **an industrial demonstrator** for three-dimensional moulding process of natural fibre composites.
- ▶ **A moving head** for the 3D printer, powered by heated hoses, able to draw the designed geometries, so that the artefact satisfies all the requirements of an high efficiency building envelope.
- ▶ Some **artefacts** that meet the thermal, acoustic, structural, eco-compatibility and fire/smoke requirements and certified prototype tests that verify the compliance with the target requirements.

Project activities

The project consists of the below Work Packages.

WP1: Project management, dissemination and communication activities.

WP1 activities will concern the coordination of project activities, the verification of their appropriate timing, the activation of effective external and internal communication and the enhancement and dissemination of the project results.

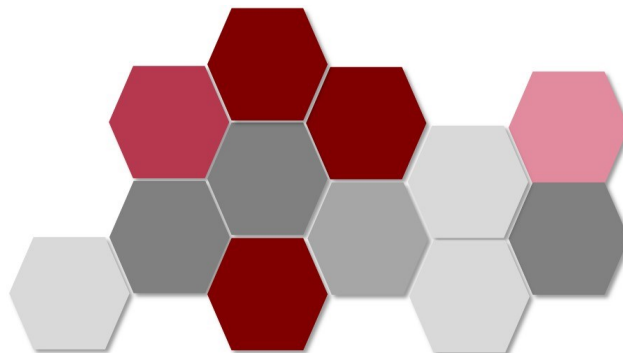
WP2: Design of demonstrator and artefact

WP2 activities concern the design of the demonstrator, represented by an extruder and a "3D printing" machine, for the extrusion of prepared materials and the printing of a demonstration panel that meets all requirements.

WP3: Development of material mixtures

Different types of materials will be selected and polyurethane and epoxy composites will be produced on a laboratory scale, varying the composition of formulations and process conditions.

During the consolidation phase, the study of rheology and the study of chemical-physical and mechanical properties will be carried out.



WP4: Realization of the demonstrator

In this phase the extruder and the Cartesian robot will be realized; they will take care of the nozzle movement and therefore of the artefact 3D printing.

WP5: Experimentation of the demonstrator and the artefact with the production of construction elements

The demonstrator and the artefact designed and realized through 3D printing will be experimented, by implementing the following main activities:

- Three-dimensional modeling of the constructive element to be produced;
- Model optimization for the printing using the demonstrator;
- Slicing configuration for printing with the product demonstrator;
- Slicing of the model and production of the G-code;
- Printing of the model; laboratory tests: with thermo-flow meter, acoustic insulation, reaction to fire, fire resistance, structural and eco-compatibility tests.

Project Partners

The project is carried out by a Temporary Association (ATS) which includes:

Z LAB S.r.l. - Lead company - which operates in the industrial and civil sector and offers acoustics and RAMS analysis services

iMaS s.r.l. - company operating in the sector of digital technologies (robotics, coding and 3D printing), applied to education

CALPARK S.C.p.A. - Science and Technology Park of Calabria

University of Calabria - Department of Chemistry and Chemical Technologies