About BOTTA

Botta Prefabbricati **(https://www.bottaprefabbricati.it)** is an Italian SME that has been working in the construction sector for over 100 years. At beginning, it was a furnace producing bricks and then it became a manufacturer of prefabricated components for the construction industry. In this field, Botta Prefabbricati has also started a research activity on new prefabricated products with the aim of developing solutions capable of satisfying the growing demands of sustainability and safety, as in the case of the predalles slab. The installation of the predalles is very easy and convenient and allows a considerable saving of time and wood moulds. As main partner of this project, Botta Prefabbricati intends to launch a new production process aimed at marketing new predalles (i.e., "GreenDealles") capable of satisfying the Green Public Procurement.

About Polityecnico of Turin

Politecnico di Torino **(https://www.polito.it)** has 11 multidisciplinary Departments with 2,500 people working on R&D activities in all the fields of Engineering, Architecture and Design. It provides its own scientific skills to companies interested in innovation, through research and consultancy services with a multidisciplinary, multiservice, and customer-oriented approach. The aim is to meet the needs of companies to solve complex issues by supporting them with tests, numerical analysis, and prototyping. In this specific project, MastrLab of Politecnico di Torino will be involved in the project. It is an official laboratory that comply with Law 1086 of 5/11/1971 "Rules for reinforced concrete, normal and prestressed, and steel structures". MastrLab is based in the Department of Structural, Building and Geotechnical Engineering and occupies an area of about 2000 square meters on two floors. MastrLab will support Botta Prefabbricati and ETRA for designing and producing "GreenDealles", by measuring the mechanical and ecological properties of the new predalles.

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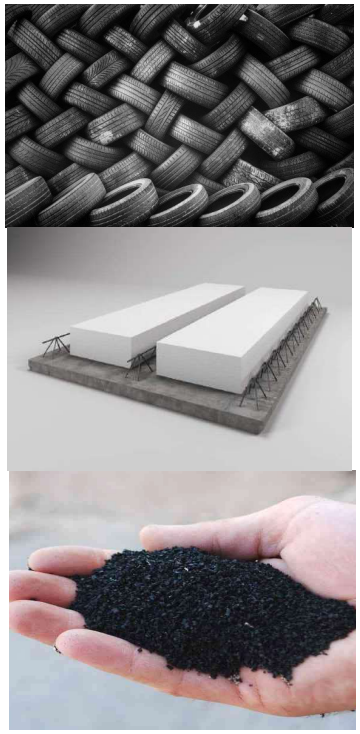
ETRA 25 YEARS
EUROPEAN TYRE RECYCLING ASSOCIATION

BOTTA PREFABBRICATI

POLITECNICO DI TORINO

GreenDealles Project

Concrete with Recycled Tyre Materials



www.etra-eu.org

About Tyre Recycling

Post ConsumerTyres are an important waste stream generated every year in Europe and the world. 3,5 million tonnes of EOL tyres are produced in the EU every year. It is estimated that only 18 % of Recycled Tyre Materials are used in Building Construction. Still low, compared to the potential of the sector and compared for example to 39% of RTMs used in Sport sector,

Tyre recycling has some peculiarities that distinguish it from other recycling sectors, as Recycled Tyre Materials (RTMs) are not used to produce new tyres. RTMs produce new materials: rubber, steel fibres and textile fibres, that are used in many different products and applications, from roads and road furniture to sport surfaces, from building materials to infrastructure – and many others.

About Concrete

Concrete is a construction material composed of water, cement, aggregate (sand and Gravel), and additives made by:

- 6% air
- 11% portland cement
- 41% Gravel or crushed stone
- 26% Sand
- 16% Water

After water, concrete is the most widely consumed substance on Earth.

The impact of concrete

Producing a ton of portland cement requires about 4 GJ energy, and releases about 1 ton of CO2 into the atmosphere. Portland cement is responsible for about 5% of the global loading of CO2 into the atmosphere.
Concrete components are consumed faster than they can be replenished (resource depletion). The world consumption of aggregates exceeds 40 billion tonnes a year. This is twice the yearly amount of sediment carried by all of the rivers of the world. It is possible to reduce CO2 /kg by substituting the virgin components with recycled materials, such as:

- recycled concrete aggregate, in substitution of virgin normal weight aggregates
- Rubber (from end of life tires) in substitution of light weight aggregates
- Steel (from end of life tires) in substitution of steel or textile fibres in sositution of plastic fibers

Project summary and main objectives

The aim of this project is to create a prototype of a new predalles slab used to cast partially precast floors of civil and industrial buildings. In this slab, herein called “GreenDealles”, a part of the traditional virgin components of concrete and reinforcing bars will be substituted by rubber and steel fibres from end-of-life tires. Through the production of “GreenDealles”, a new process will be introduced within the construction industry, which also includes the activities related to the management and recycling of waste materials. In this way, “GreenDealles” will satisfy the European Green Public Procurement in the field of designing and construction of new public buildings, and in the renovation and maintenance of the existing ones.

About ETRA

ETRA is an independent, member-driven European Association open to those involved in the diverse activities that contribute to the ‘tyre recycling industry’. ETRA is the result of a project created in 1990 and funded in 1992, to bring together the disparate elements of tyre recycling in Europe.

ETRA members reflect both the public and private sectors involved in the environmentally safe treatment and use of post-consumer tyres. Policy and decision makers as well as those charged with organising and connecting the links in the recycling chain are represented. With a focus on material recovery, ETRA members include material producers (i.e., granulaters, compounders) and users (e.g., civil engineers, product manufacturers), as well as collectors, manu-facturers of recycling equipment, research and training bodies, product developers and users of new technologies.

ETRA has been working since 2006 in R&D projects on Recycled Tyre Materials (RTMs) in concrete. It has a deep understanding of tyre recycling process, quality of materials obtained and procedure to improve and control quality. ETRA has good contacts with tire recycling value chain and end-users and high networking capacity. ETRA, thanks to its central role in tire recycling sector, will make available steel fibres and rubber aggregate complying with quality specifications defined in the project. ETRA will disseminate the results targeting both tyre recyclers and precast concrete producers.