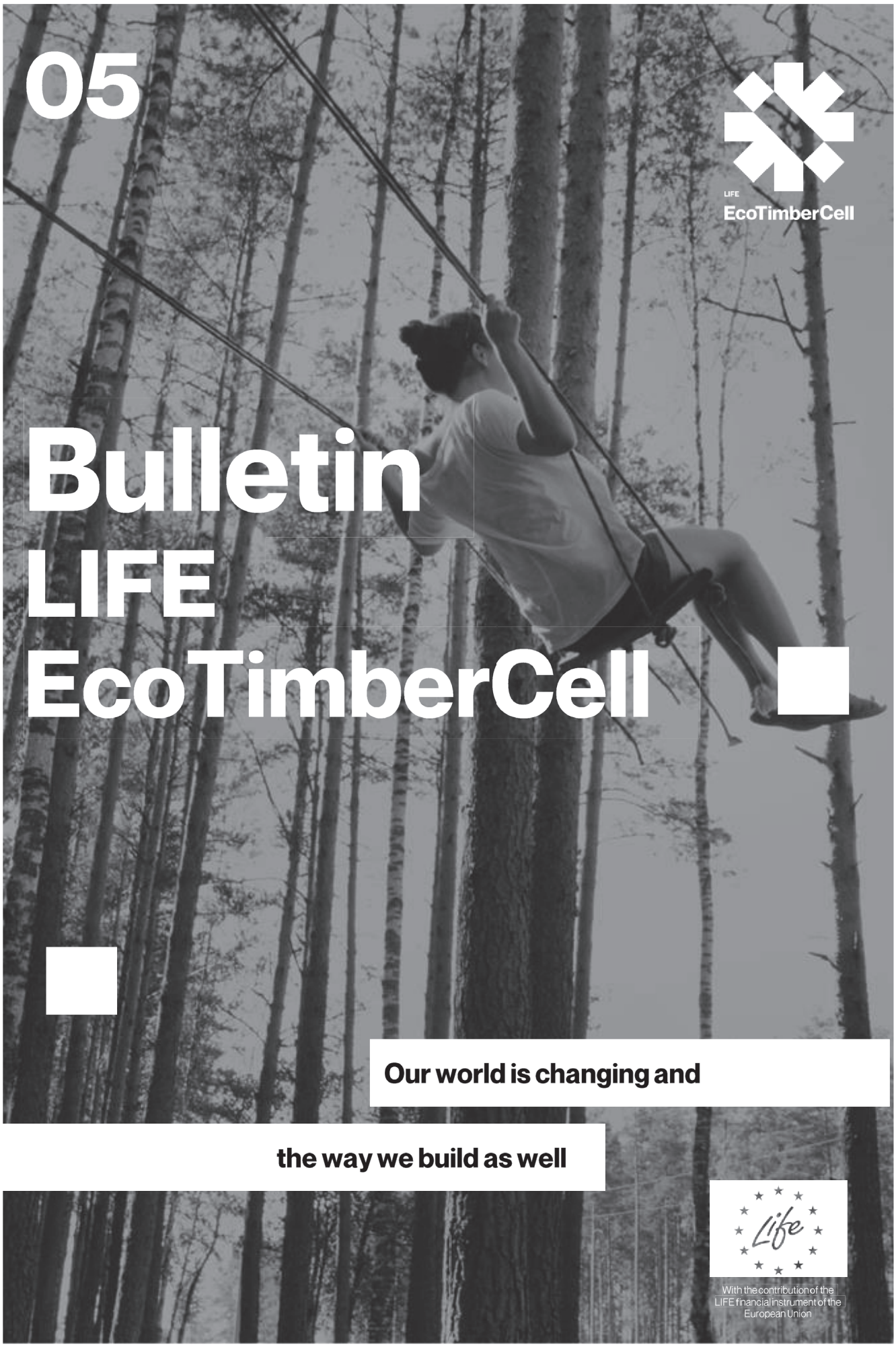

05

LIFE
EcoTimberCell

Bulletin LIFE EcoTimberCell

Our world is changing and

the way we build as well

With the contribution of the LIFE financial instrument of the European Union

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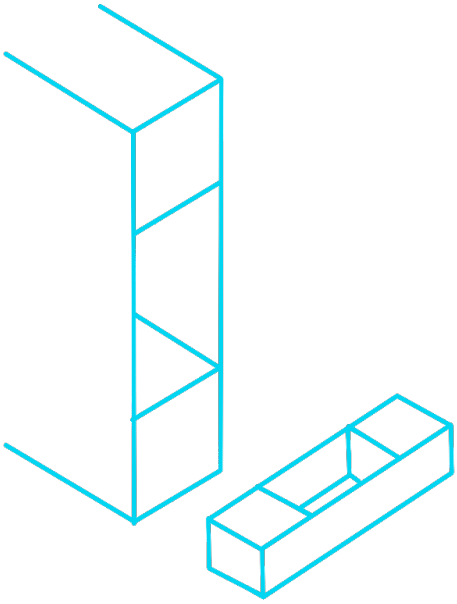
Contenido

Introduction

The content of this newsletter focuses on the **progress** of the **LIFE EcoTimberCell (ETC)** project and the state of **development of ETC products and structural systems**.



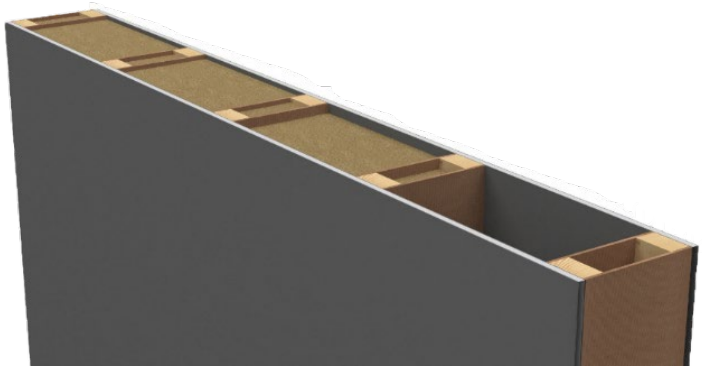
The progress of the project and its actions have been collected in the **biannual bulletins**, ranging from the project, its objectives and actions (Bulletin 1), the characterisation of the local wood and the Betanzos HB board (Bulletin 2), the presentation of the properties of the Betanzos HB board (Bulletin 3), and the development of the basic unit "EcoTimberCell" (Bulletin 4).

Continuing the project monitoring of the previous bulletins, **this bulletin 5 presents the ETC Box and ETC Frame structural systems**, as well as other progress and activities that have taken place in recent months such as **participation in the National Environmental Congress (CONAMA2020)**, the project's on-line seminars, the first collaborations with studies and other projects that will allow the **EcoTimberCell products to be used in the first works** or the results of the opinion surveys on the EcoTimberCell systems.

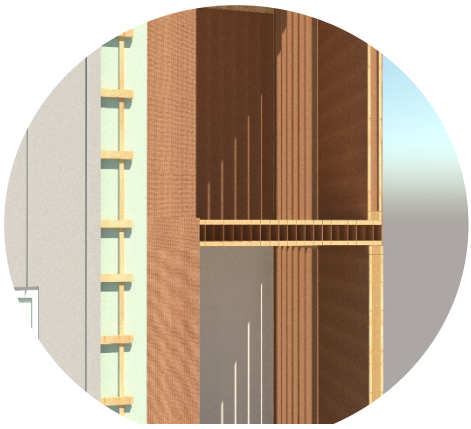
Context

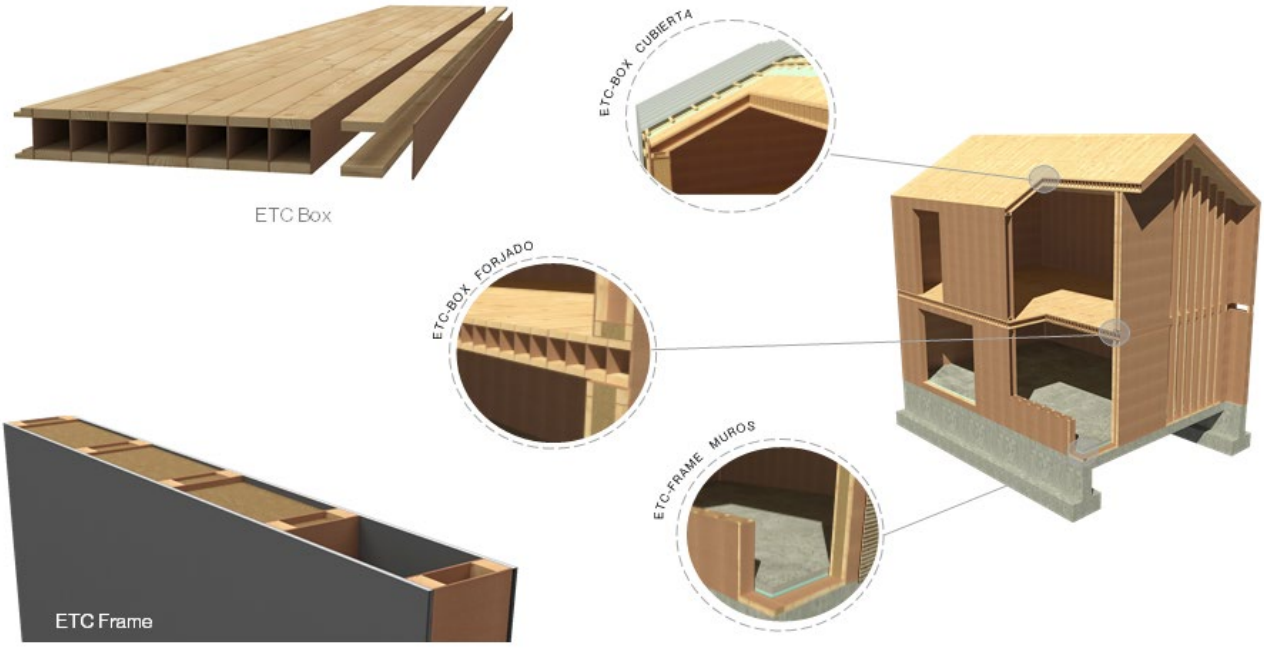
The **ETC Box and ETC Frame** systems are based on the EcoTimberCell basic unit. The **ETC Box is a high-performance, material-optimised slab or roof system**, while the **ETC Frame system is an energy-efficient framed wall** for the construction of vertical enclosures.

The development of these structural elements is carried out within the ongoing action C4, and the work will be extended in action C5 with the study and planning of construction details and connections between systems or with other building materials.

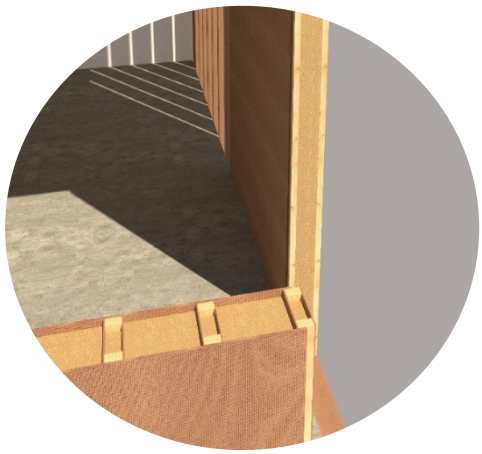


These structural systems **offer a solution with low carbon footprint materials that increases the energy efficiency of medium-cost housing** and acts directly on one of the main causes of greenhouse gas emissions and, therefore, in the mitigation of climate change.



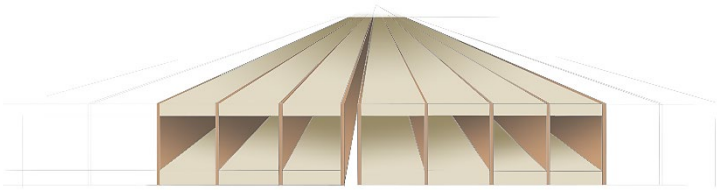


The final objective is the proposal of a complete product called **ETC Home** in which the different EcoTimberCell products and structural systems are combined to configure **a home adapted to the environment with an ecological component** to reduce emissions and mitigate climate change.



System development

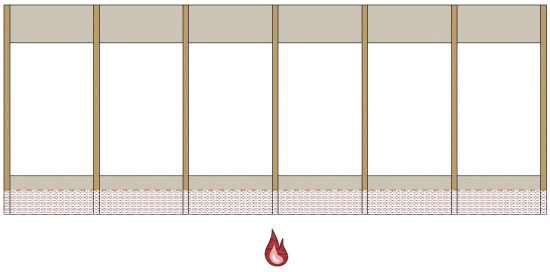
The ETC Box system is an aggregate of ETC cells that forms a modular slab panel with high structural efficiency and high performance, **as the interior can include thermal-acoustic insulation.**



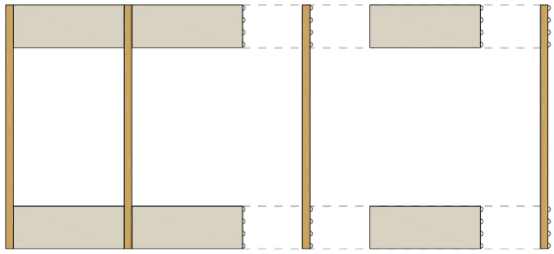
Geometry of ETC Box

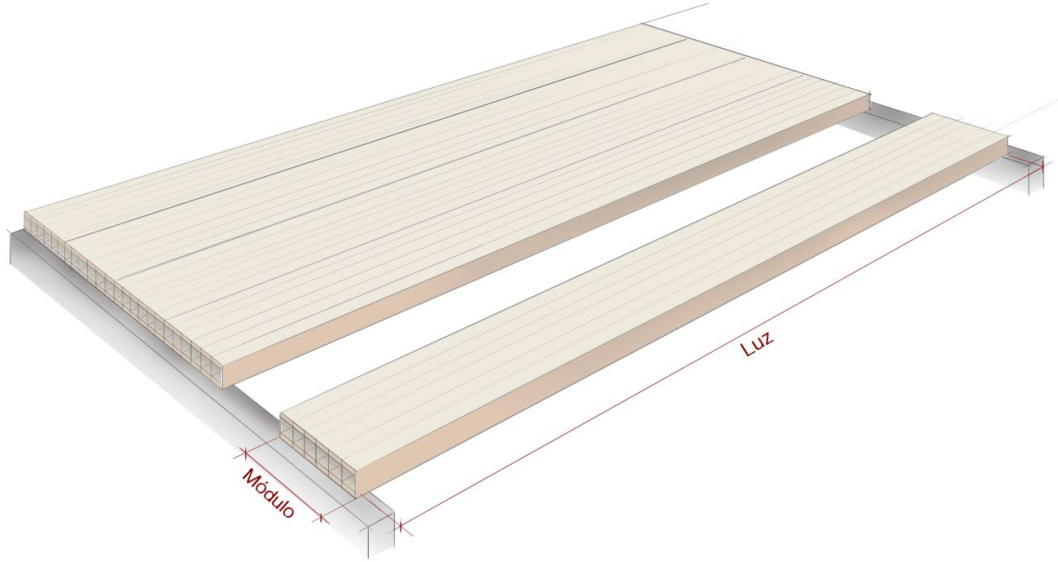
The geometry of the ETC Box follows the shape of the ETC cell as a **linear, "box-like" structural element**, made up of timber strands connected by a Betanzos HB hardboard.

The wood used in the cords will be local, with sustainable forest certification (PEFC or FSC) and of the main species available in the region ***Pinus pinaster, Pinus radiata, Castanea sativa and Eucalyptus globulus***. The size of the strands is determined by the stresses to which the structure will be subjected, thus **obtaining an ETC Box with strands of different thicknesses**. One of the most relevant aspects in the dimension of the chords is the calculation in a fire situation, in which the lower chord of the system increases its thickness to adjust to the requirements of each project.



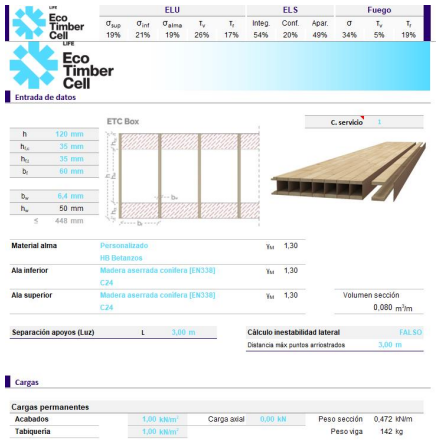
For the manufacture of the modules it is foreseen to assemble the cells leaving a single board as a core to complete the ETC Box panel with a total width of 600mm.

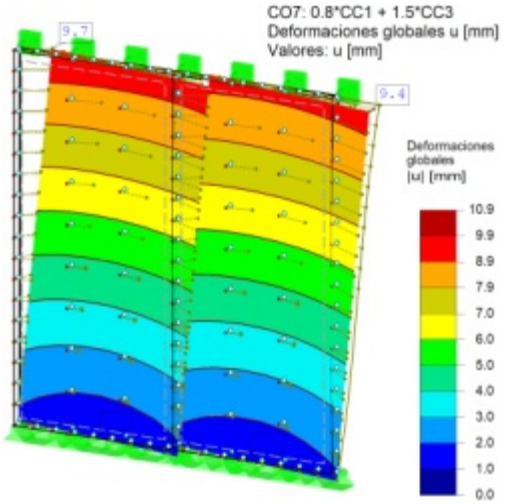




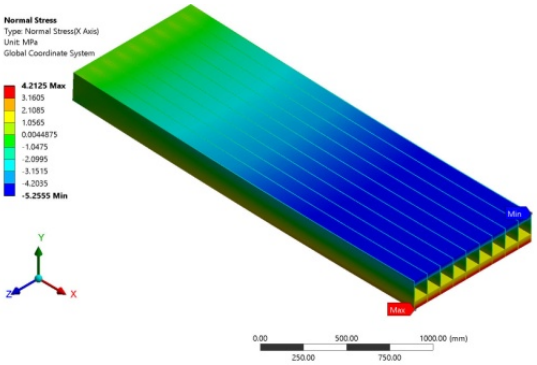
Calculation and numerical simulation

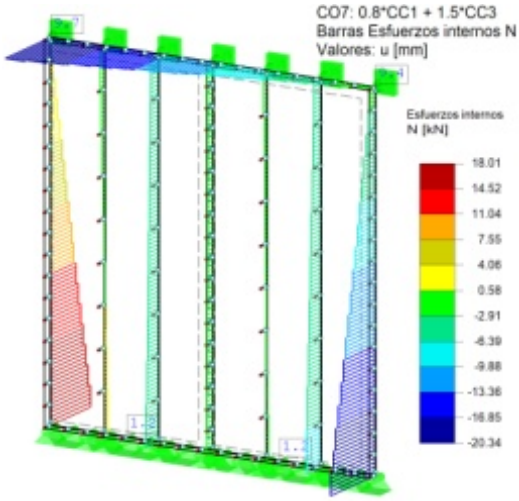
In order for products to obtain **CE marking, it is necessary to develop calculation methods that will be validated by mechanical tests**. For this purpose, spreadsheets have been developed that allow the sections to be quickly adapted to any structure.





The development of the calculation has been contrasted by numerical simulation by means of finite elements, using the ANSYS Workbench software.





By means of the finite element calculation, it is possible to **simulate the expected behaviour**, facilitating the development of the calculation methods for both the ETC Box and the ETC Frame.

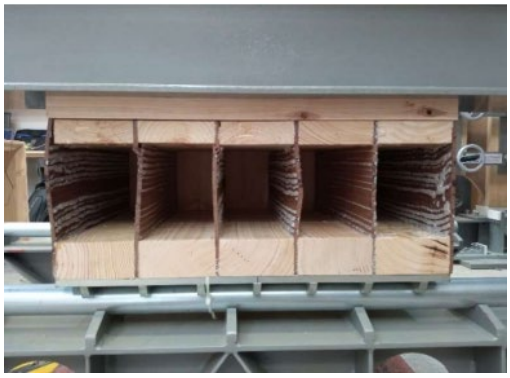
ETC Box prototype tests

- Manufacturing.

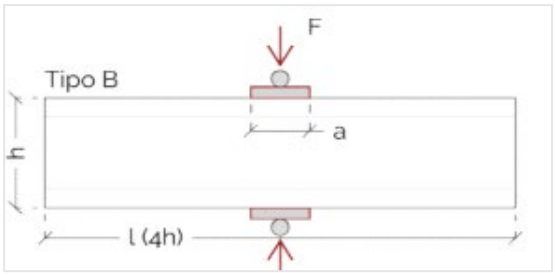
In order to validate the ETC Box calculation model, a manufacturing campaign of 54 test specimens has been carried out for tests of different geometries, one of the necessary requirements to obtain the CE label.

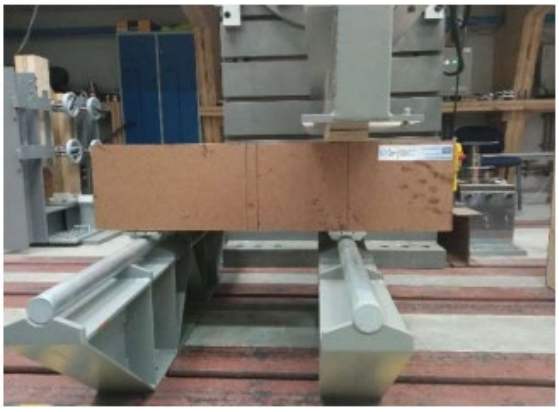
- Mechanical testing and validation

Compression test perpendicular to the faces, type A.

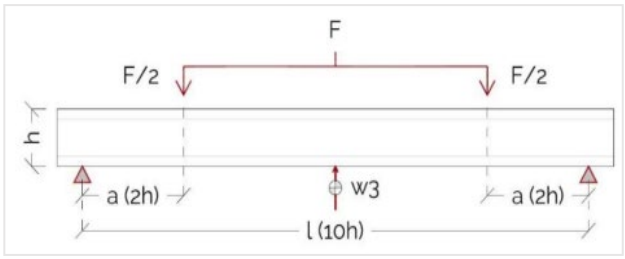


Compression test, perpendicular to the faces, type B

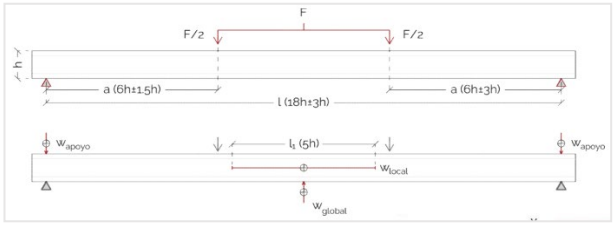




Shear test perpendicular to faces



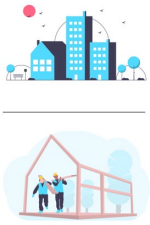
Bending test perpendicular to the faces.



The test campaign has produced **good results for the ETC Box panels, as the estimated values** of the calculation model and those obtained during the tests coincide.

Tests to validate the ETC Frame system will be carried out in the near future.

EcoTimberCell Opinion Survey

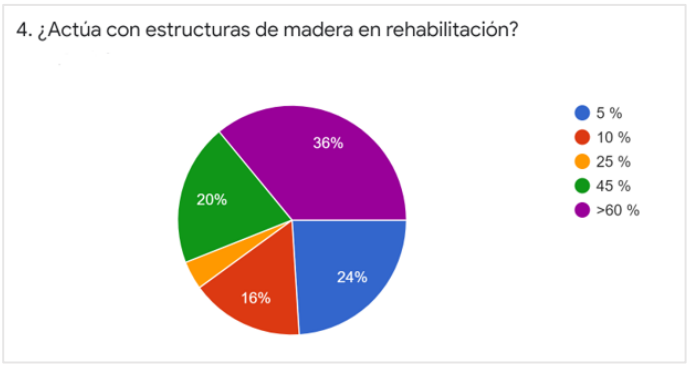


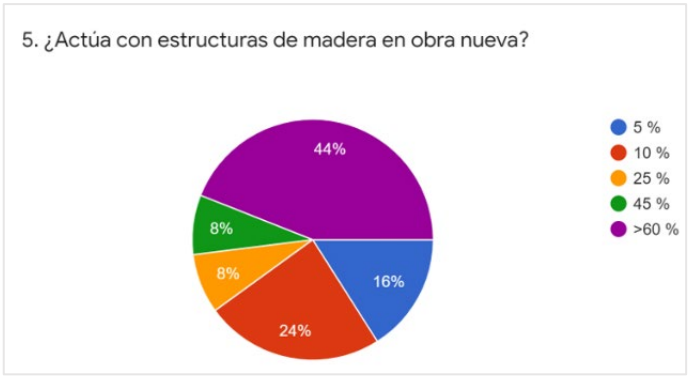
The LIFE EcoTimberCell project is currently working on the **different lines of business and commercialisation of the structural systems developed in the project**. For this, we consider it essential to know the perception of the EcoTimberCell systems, as well as the possible social impact that projects like this can generate in the mitigation of climate change. For this reason, we prepared a survey in which we invited **professionals from the construction sector, forest owners, public administration workers and technological research centres** to provide their opinion on the different key aspects of our project and the benefits it can bring to the construction sector.

https://cutt.ly/5mBDfMw

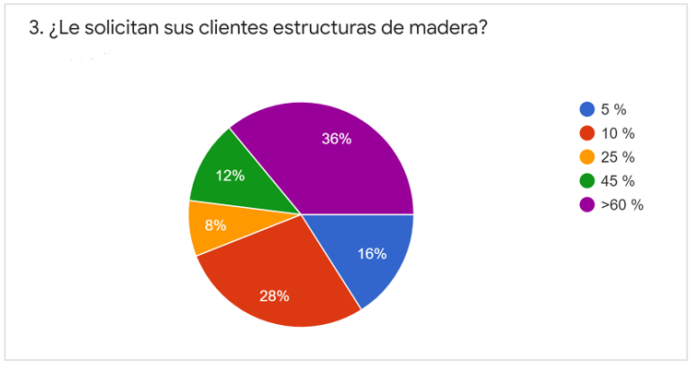
The survey was very well received by the target audience, with **professionals in the construction sector** being the group with the highest response rate (**29.8%**).

Within the questions focused on professionals in the construction sector, questions were asked **with the aim of assessing the technical perception of the use of wood and the real demand for the product in projects**. In this sense, the results of questions 4 and 5 stand out, in which **the majority of those surveyed stated that more than 45% of timber structures** are used in refurbishment and new construction projects.

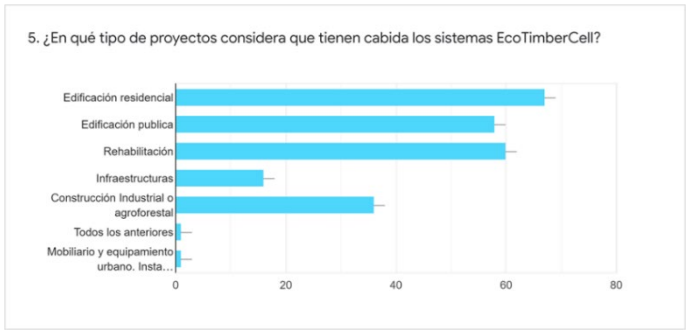




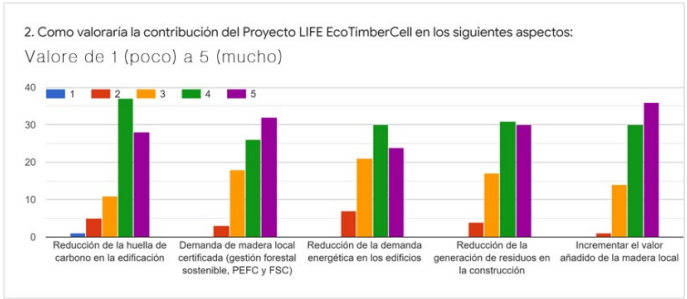
Regarding the final client's view on the use of timber, the results are a little more diverse, as 36% of the respondents stated that more than 60% of their clients request timber structures, while 28% of them stated that only 10% of their clients request them to do so. This variation may lead us to assume that **the proposal to use wood as a structural element is strongly encouraged by the technicians responsible** for the projects.



Regarding the section on knowledge of the project and perception of the systems, a large part of the respondents (59%) stated that they were not aware of the LIFE EcoTimberCell project before carrying out the survey. However, from the data collected, it can be seen that the ETC systems are well received because of their benefits and competitiveness in the construction sector.



This survey is of great interest for the project in order to know the first impressions of the ETC systems, having provided a brief information, without going into technical data. At the end of the project, another opinion survey is planned, which **will be of interest to assess the evolution of the clients' perception** of the project and the proposed products and structural systems.



Webinars

LIFE EcoTimberCell has held **webinars** every Wednesday during the months of May and June with experts and the technical team. The seminars were divided into three thematic blocks:

- Wood in Galicia
- Timber in the face of climate change
- LIFE EcoTimberCell, ecological products and structural systems

In this first period, the first block has been developed with the participation of numerous companies and technicians to contribute to the promotion of the **Galician forestry sector**, the use of **certified local wood** and **quality structural wood**.

The first two days were devoted to presenting the current situation of the Galician forestry sector, the forest and the industrial sector, thanks to the **Galician Forestry Association** and **Fearmaga**, and to promoting the certification of sustainable forest management and the chain of custody by **FSC** and **PEFC**, accreditation and certification organisations.

The webinars proposal has allowed contact with other projects such as **LIFE Forest CO2** and **LIFE Climark** and **3edata** to present the results of the survey on ecosystem services provided by productive forest systems.

The following days focused on wood product certifications, Life Cycle Assessment, carbon footprint quantification and the characterisation of structural timber with explanation of visual classification and destructive and non-destructive methods under the leadership, in this

case, of the project partners **ITEC, CETEMAS, USC** and the **Joint Research Unit EIXO** and **Ms. Raquel Gonçalves** from the State University of Campinas (Brazil).

Finally, the impulse of wood in Galicia and from Galicia is reflected. The commitment of business and industry such as **Xilonor** or **Betanzos HB** for products with local raw materials, research and innovation from the administration and the public university, private enterprise at the level of technical and product developments represented in the **collaboration agreement between XERA and USC**, the **Joint Research Unit EIXO** (Circular Economy for a low-energy construction) between FINSA and USC and the architectural firm **Arrokabe**. The block was closed by emphasising the need for information and training in and about wood in order to enhance its value thanks to **The Cambium Design** and the **LIFE Lugo+Biodynamic** project.

It has been possible to disseminate publications such as the **Guide to supply and characterisation of structural wood** published by LIFE EcoTimberCell or the **Guide to CE marking of wood products for construction**, the result of the collaboration agreement between XERA and USC. The download links are indicated below.

https://www.life-ecotimbercell.eu/guia-de-suministro-y-caracterizacion-de-la-madera

https://www.pemade.com/

After the presentations, spaces for debate have been generated to share ideas and objectives in which we thank the speakers and attendees for their interaction.

The seminars will resume in October in the hope that they will be just as enriching, and information will be posted on the LIFE EcoTimberCell website.

CONAMA rewards ETC's eco-design

LIFE EcoTimberCell has participated in the **Ecodesign Competition** of the National Environmental Congress **with recognition from the jury** for the proposal to create a circular Bioeconomy in Galicia that affects both the forestry sector and the construction sector through the approach of structural products that enable the reduction of CO2 emissions, increase the energy efficiency of housing and the optimisation of raw materials.

The slogan of CONAMA 2020, **the Recovery we want**, has brought together experts from multiple disciplines to analyse the current situation and present numerous initiatives and projects that address aspects such as climate change and biodiversity loss as major environmental challenges, sustainable

development, circular economy or nature-based solutions, and that work on innovation to move towards more sustainable, livable and climate change-adapted cities with the involvement of private enterprise and the administration.

And, in this context of boosting environmental and energy transition, LIFE EcoTimberCell has been able to connect and enrich with several companies and, highlighting, above all, the meeting with several LIFE projects such as::

- **LIFE Recypack,** circular economy of commercial plastic packaging in urban environments.
- **LIFE AMIA** which aims to reuse wastewater for agricultural use and aquifer recharge, in the quest to protect the aquatic environment against pollution caused by pathogens and micropollutants not removed by conventional wastewater treatment plants (WWTP).
- **LIFE CO2IntBio**, reduction of CO2 emissions by industrial integration and creation of new value chains and a new product ("green" CO2 with the objective of climate change mitigation). One of its objectives is to improve the circular economy by converting two wastes (biomass flue gas and vegetable waste) into new materials
- **LIFE REMoPaF**, Recovery of the endangered mollusc Patella Ferruginea through Mobile Artificial Inert Substrates.
- **Horizon 2020 Nature4Cities**, a project that creates a platform for the evaluation and dissemination of knowledge on nature-based solutions for the regeneration of cities.

As a dissemination of the recognition of LIFE EcoTimberCell in the CONAMA 2020 Ecodesign Contest, **the project participated in the programme Hoy por Hoy of Radio Lugo highlighting the objective of reducing the effects of climate change by intervening in the construction sector thanks to the promotion of the use of wood** as a structural element, which involves long-term CO2 sequestration, and in the Galician forestry sector by promoting km.0 wood and its sustainable forest management, for the benefit of the Galician territory of great forestry potential.

The interview can be accessed through the Radio Lugo website, in the archive of Thursday 3 June 2021:

https://play.cadenaser.com/audio/1622722434230/

Projects with EcoTimberCell systems

MOL Arquitectura

They were committed to EcoTimberCell right from the start. **MOL Arquitectura stands out for being professionals involved with sustainability and environmental awareness and promoters of the use of wood in their works** with attention to detail and constructive rigour and we have felt this way working with them.

We started conversations to develop a small intervention in the ecological winery Boas Vides, a family project of circular economy and, after the design, calculation and development of EcoTimberCell products and systems, it is already becoming a reality.

The slab is made of EcoTimberCell double cells that will be visible. They will rest on the perimeter load-bearing walls of the warehouse and on the central metal beam that crosses the space.

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Manufacturing took place in April and it was in May that the Quality Control campaign was carried out in the PEMADE laboratory, to which the technical designers and the property owners were invited.

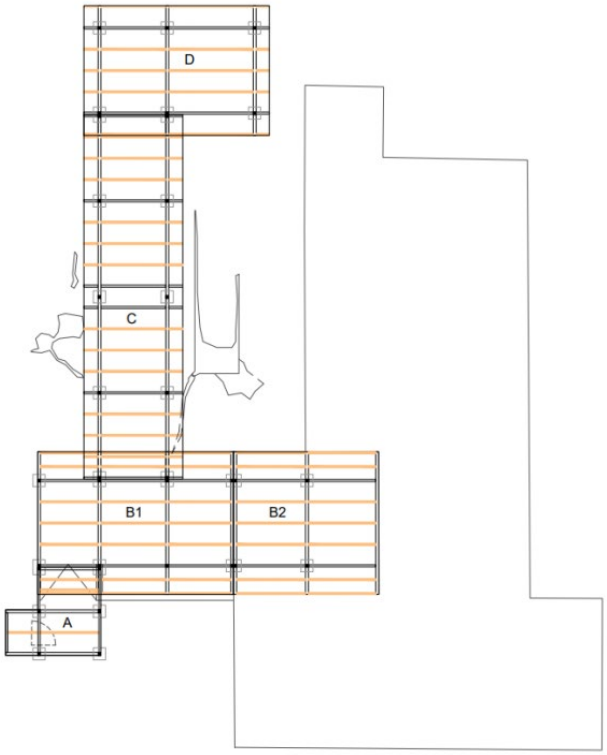
The material was supplied in the first week of June, taking advantage of the visit of the builder of the project, who was accompanied by MOL Arquitectura and Maderas San Martin.

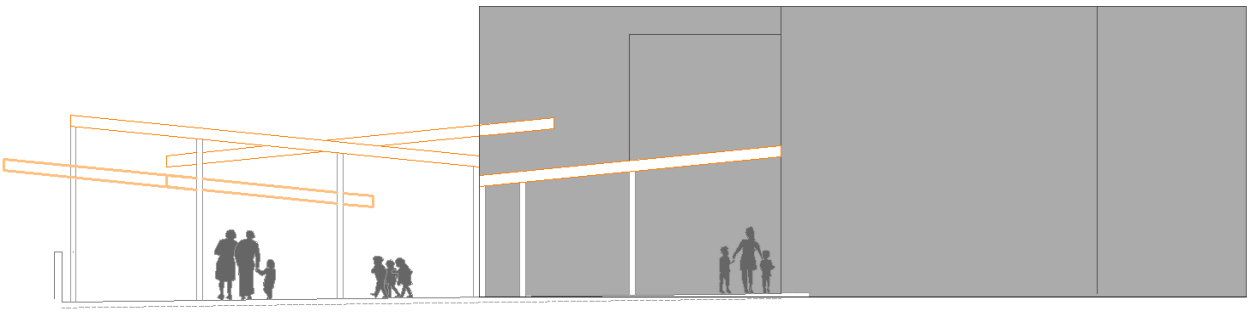
This first demonstration of EcoTimberCell products will be installed on site in the coming months.

Colaboración con LIFE My Building Is Green

The collaboration between the LIFE My building is Green and LIFE EcoTimberCell projects takes shape in an action in Évora. **These are exterior wooden modules that generate covered spaces that allow outdoor activities in the courtyard of a school** in the Portuguese city in which the secondary structure are EcoTimberCell beams, in some cases with cantilevered sections. The action will serve as an impetus for these minimal timber systems that aim for maximum structural efficiency.

The **LIFE EcoTimberCell team has worked together with LIFE My building is green and the Portuguese technical designers** to find the definitive solution for this succession of single-pitch roofs that create an ensemble at different heights that also protects the school's main entrance.





News

Presentation of LIFE ETC at FP Lugo [25/03/2021]

The LIFE EcoTimberCell and LIFE Lugo+Biodynamic projects present their projects to the students of the intermediate cycle of construction and the higher cycle of projects of the FP Edificación Politécnico de Lugo. During the conference, the environmental benefits of wood and its potential in the construction sector to mitigate climate change are discussed. The Galician forestry sector is highlighted by the EcoTimberCell ecological cellular systems made with certified local wood and by the initiatives of the LIFE Lugo+Biodinámico such as the construction of the Impulso Verde building, the first building made entirely with local structural wood. We are very grateful for the great interest shown.

Contact with C2M as a business strategy [02/2021]

EASME/NEEMO makes possible a meeting in February with the C2M team to present the services they offer to enable the internationalisation of ETC or new technology licensors in Europe.

Subsequently, in March, LIFE ETC is invited to a networking session between LIFE projects to share experiences and foster possible synergies.

Sawmill visits and dissemination of the Guidebook [01/2021]

The dissemination of the Guide for the supply and characterisation of structural timber continues. During 2021, copies have been explained and delivered to several sawmills in Galicia.

Visit to UPM, dissemination of the Guide [04/06/2021]

Taking advantage of the attendance to the National Congress of Environment in Madrid, LIFE EcoTimberCell coincides with organisers, teachers and students of the Course of Construction with Wood of the Polytechnic University of Madrid in the Finca La Pontezuela in their visit to the Interpretation Centre of El Olivar 5 elementos.

LIFE EcoTimberCell thanks the Gómez-Pintado Foundation and the professors of the Course for the kindness and all the attentions and for allowing the presentation and delivery of copies of the Guide for the supply and characterisation of structural timber.

LIFE EcoTimberCell presented to the CIC [02/2021]

LIFE EcoTimberCell is presented to the Construction Industries Commission (CIC) by project partner ITEC as green products for a building model for climate change mitigation and forest value enhancement.

Update of the Board Catalogue [02/2021]

At the beginning of 2021 the Catalogue on the improved EcoTimberCell system board, a hardboard produced by the Galician company Betanzos HB, has been updated. The advantages of the improved 6.4mm thick standard and water-repellent (5.4 and 6.4mm) board are presented, as well as its physical and mechanical properties for a new structural use.

LIFE EcoTimberCell at Asturforesta [17-19/06/2021]

LIFE EcoTimberCell present at the XIII edition of ASTURFORESTA, recognized as the only international Forestry Fair in the Iberian Peninsula by the Ministry of Economy and Competitiveness, at the CETEMAS stand.

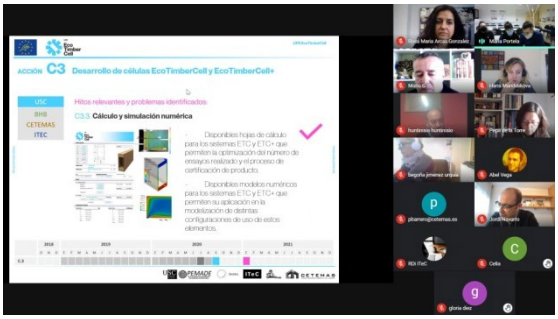
LIFE EcoTimberCell visiting constructors [01/2021]

LIFE EcoTimberCell visited in January the company RESAI, at its headquarters in Lugo; a company dedicated to the construction of buildings and industrial warehouses and rehabilitation of houses, hotels and rural houses. Precisely, during the meeting, the potential of EcoTimberCell products in both new construction and rehabilitation was discussed, as well as the importance of the use of wood in construction and the promotion of the sustainability of the product using certified local wood.

LIFE ETC monitoring visit [01/2021]

In January, an on-line monitoring visit was carried out by the EASME manager, Hana Mandelikova, and the NEEMO monitor of the LIFE EcoTimberCell project, María José de la Torre.

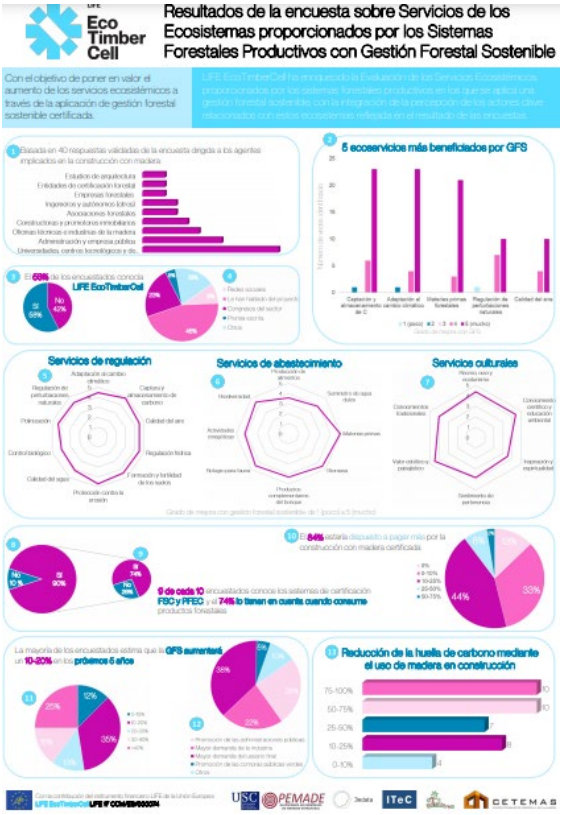
The objectives achieved and the guidelines set for the progress of the project during the year 2021 were presented.



Ecosystem services survey results published [01/2021]

Results of the survey on ecosystem services provided by productive forest systems integrated in the *Ecosystem Services Assessment of Productive Forest Systems available*.

https://cutt.ly/0m1mu88



LIFE EcoTimberCell aims to value the increase of ecosystem services in productive forest systems, through the Certified Sustainable Forest Management (SFM) promoted in the project with the objective of achieving an increase of more than 1.1% of the certified forest area.

Published videos [01-06/2021]

Certified wood in the LIFE EcoTimberCell project, an action against climate change

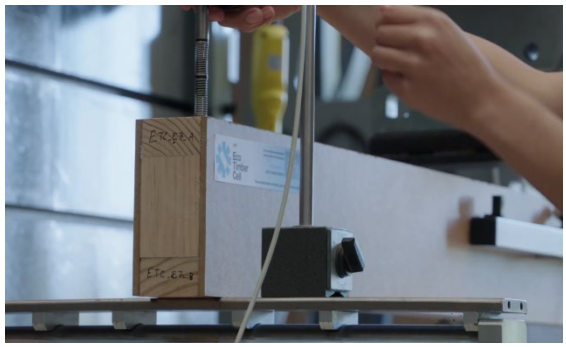
The LIFE EcoTimberCell project is committed to solutions in the construction sector based on certified local wood and its importance in the face of climate change.

Click on the following link to watch the video:

https://youtu.be/oF5rcqOqmPo

EcoTimberCell: a commitment to climate change mitigation

LIFE EcoTimberCell proposes products and structural systems with an efficient use of material and a lower carbon footprint.



Click on the following link to watch the video:

https://youtu.be/VUphZVDpX1w

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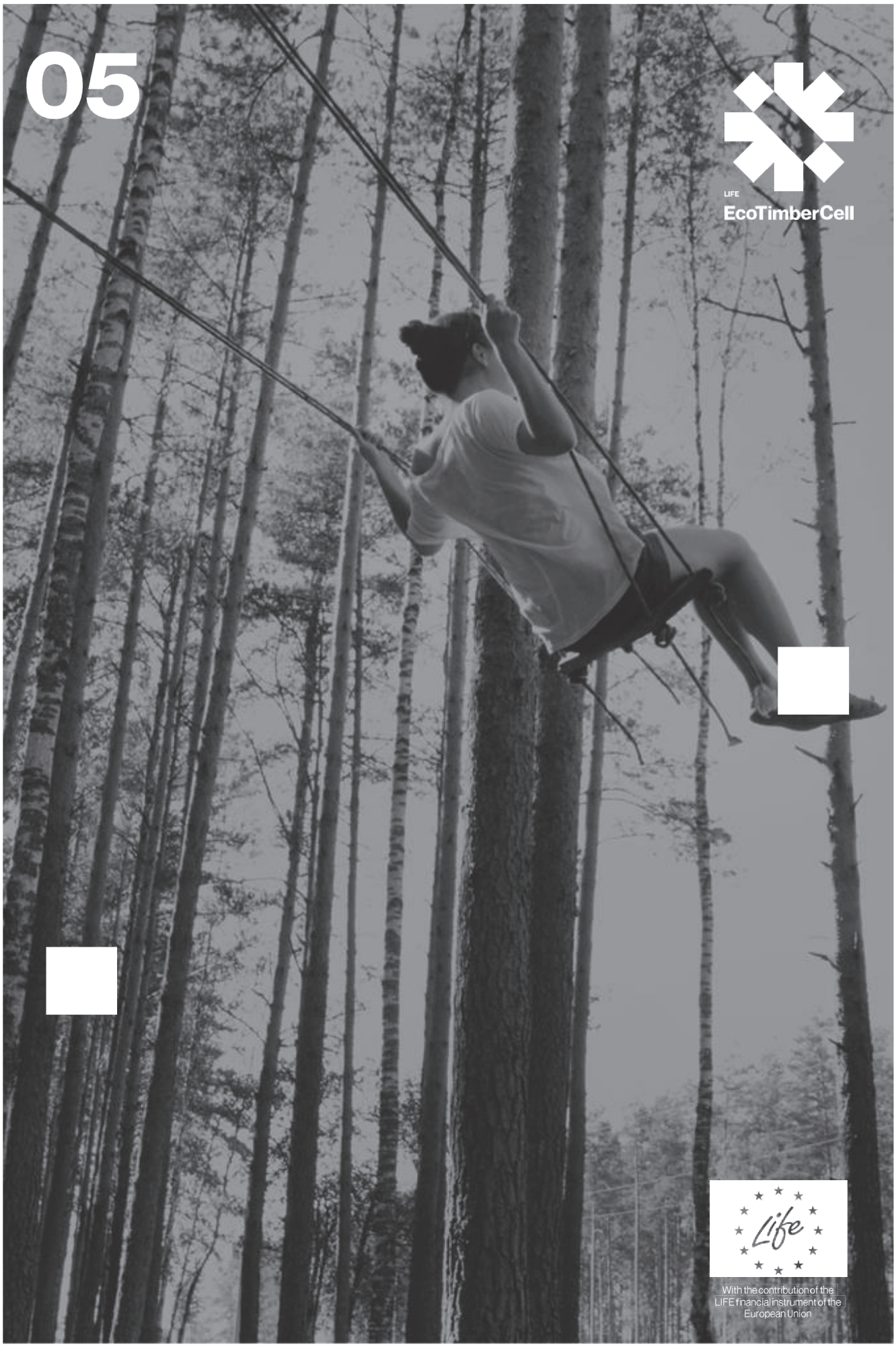

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With the contribution of the
LIFE financial instrument of the
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