EUROPEAN RECYCLING & CIRCULARITY
IN LARGE COMPOSITE COMPONENTS

Newsletter 03

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Dear Reader,

Welcome to **Issue #3** of the EuReComp Newsletter!

In this edition, we're thrilled to highlight the significant strides made in Work Package 2 (**WP2**) and Work Package 7 (**WP7**), crucial components of our endeavor to revolutionize waste management practices in the composite materials industry. WP2 is dedicated to refining waste management strategies, formalizing requirements for redesigning and reusing EoL components, enhancing smart detection capabilities through machine learning algorithms, and streamlining dismantling processes to minimize environmental impact. On the other hand, WP7 spearheads training and life-long learning initiatives, focusing on completing content for the Moodle platform, preparing an overall concept for training, supporting project dedicated workshops and applying optimized training concepts to collect feedback for further improvement.

Enjoy exploring the progress and achievements within EuReComp, and stay connected with our project through our website and social media channels!

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WP2: Separation decision making tool for demo cases

As we reach M24 of the EuReComp project, Work Package 2 (WP2), led by **AIMEN**, has achieved significant milestones in the development of the Separation Decision-Making Tool, crucial for sustainable waste management in the composite industry:

- **Methodology Development:**

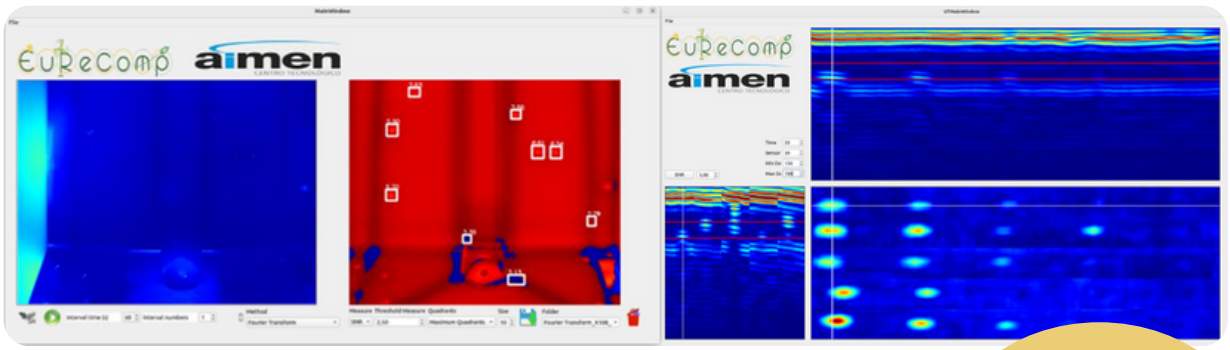
The methodology to be followed by the SMART TOOL has been meticulously developed, setting the stage for intelligent decision-making regarding end-of-life (EoL) components from both wind turbine blade (WTB) and aircraft industries.

- **Advanced Requirements Definition:**

WP2 conducted an extensive review of European regulations related to EoL, structural design standards, case studies, and guidelines on conventional materials reuse. This comprehensive research has provided invaluable input to the SMART TOOL, facilitating decisions on the potential second life of WTB and aircraft EoL parts. Moreover, specifications for suitable segmentation approaches have been established, alongside requirements for redesigning and reusing, along with the first draft of product specifications.

- **NDT Systems Development:**

Advanced Non-Destructive Testing (NDT) systems based on IR Active Thermography and Ultrasound have been developed for defect detection, primarily focusing on aircraft EoL parts. Algorithms are now being applied to NDT data, enhancing detection capabilities and ensuring material integrity.



Active thermography being applied onto reference specimen representing WTB standard materials

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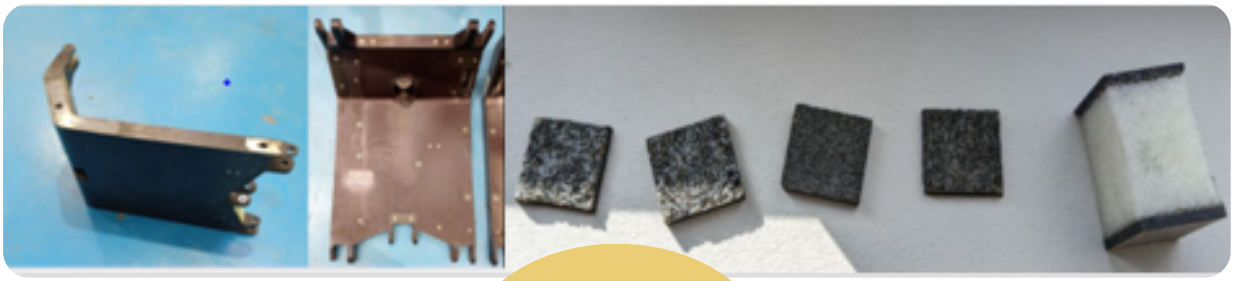
WP2: Separation decision making tool for demo cases

- **Improving Separation Processes:**

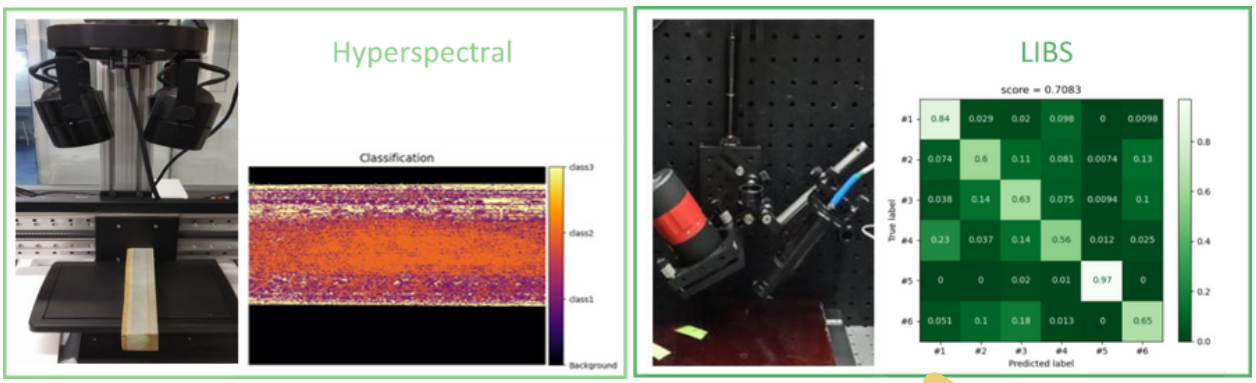
Significant efforts have been directed towards enhancing separation processes, with tests conducted using chemical and mechanical methods to separate recyclable CFRP parts from the rest of the aircraft EoL components



Dismantling and separation of an aircraft component

- **Chemical Identification Advancements:**

Advances in chemical identification systems have enabled new circular pathways. Hyperspectral imaging and Laser Induced Breakdown Spectroscopy (LIBS) techniques have been employed for identifying materials, with promising results in classifying resins used in aeronautic CFRP composites.



Classification algorithms outputs from last Hyperspectral imaging (left) and LIBS (right) experiments towards the chemical composition determination on composite specimens and reference resins, respectively.

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WP2: Separation decision making tool for demo cases

- ***What's Next for WP2***

In WP2, our focus is on refining waste management strategies in the composite industry. We'll formalize redesigning and reusing requirements, refining product specifications. Additionally, we aim to enhance smart detection capabilities through various machine learning algorithms. Identifying key improvements will streamline dismantling processes and minimize environmental impact. Our efforts will extend to expanding material chemical data characterization through new LIBS datasets and enhanced classifier models.

- **Contribution to the EuReComp Scope:**

WP2's pivotal role in developing the SMART TOOL, supported by machine learning, underscores its significance in guiding decisions regarding the most profitable route for EoL components from WTB and aircraft industries. This effort aligns with EuReComp's overarching mission of sustainable waste management and circular economy principles.

WP7: Training & Life-long learning

WP7 has an important role for the whole EuReComp project as this work package is responsible for collecting results and information on the project from partners and designing a lifelong learning platform for now and future of the project as a resource to learn about the project and the results and even as an online teaching platform for interested students and employees in the future. Work Package 7 (WP2), led by **KUZ**, is making significant strides in advancing training and life-long learning initiatives:

- **Survey Creation and Distribution:**

To gather insights from project partners, WP7 created and distributed a series of questionnaires tailored to different types of partners. To consider the different kinds of project partners, they were grouped into 5 clusters. Therefore, 5 different questionnaires were issued: Universities, large-scale enterprises, small and medium-sized enterprises, and research institutes (both as trainers and as trainees). The completed questionnaires were collected, and the results were evaluated and outlined. Creation, distribution of the questionnaires, and evaluation of the results were performed by Stratagem (task leader).

The results provided valuable information on training activities across various entities, highlighting differences in focus areas and preferences for presence and digital training.

- **Conceptualization of Training Methods:**

A basic structure for both physical and online training was established, laying the groundwork for the implementation of thee learning management system Moodle. This included the selection and setup of Moodle, along with the creation of initial modules and a basic structure for lifelong learning.

WP7: Training & Life-long learning

Long life learning concept

Physical training

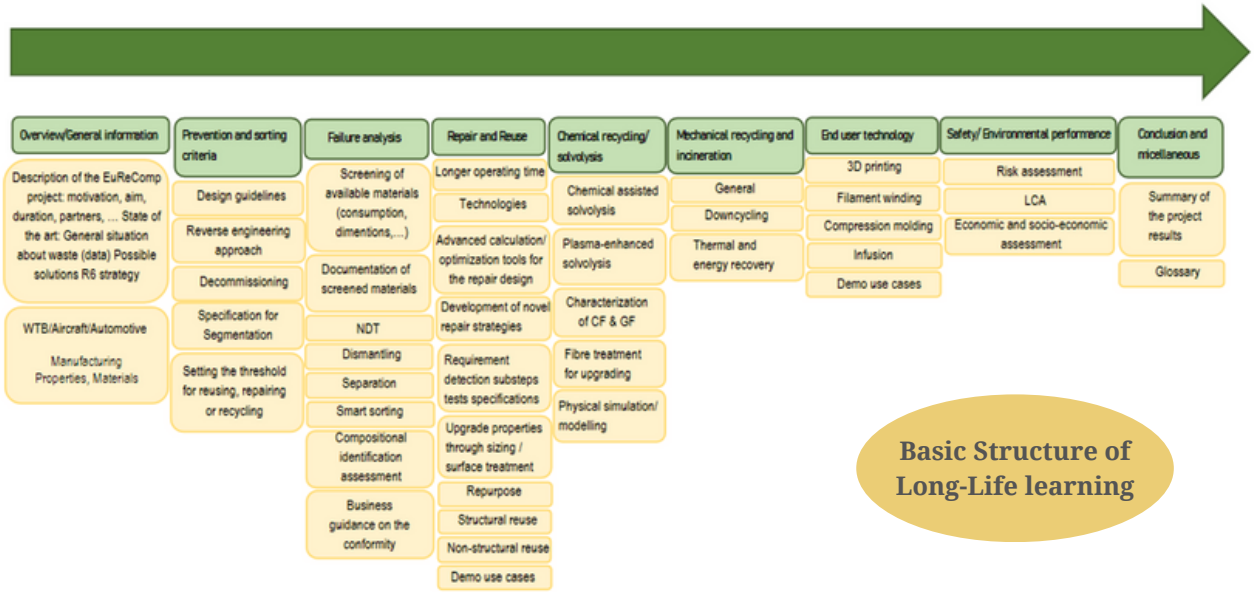
- Powerpoint (-like) presentations
- Text, pictures, (interactive) animations, videos, animated effects, AR, VR
- Oral information
- Hands on experiences
- Demonstration of processes
- Scripts, w/ glossary

Online training / E-learning

- Learning management system (LMS)
- On-demand contents
- Text, pictures, animations, (explanatory) videos
- Interactive animations (realtime 3D content)
- Downloadable files (instructional materials)
- Quizzes, tests, glossaries, surveys, chats, presentations, checklists, inclusion of external tools, …

Basic Concept Setup

Basic structure for life-long learning



Basic Structure of Long-Life learning

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WP7: Training & Life-long learning

- **Storyboarding and Content Structuring:**

WP7 developed storyboards to streamline content creation for training modules. These storyboards facilitate the organization of existing content and guide the creation of new materials, making the process more efficient. Additionally, a manual was produced to assist in generating explanatory videos from PowerPoint presentations.

- **Workshop Planning and Execution :**

WP7 collaborated with partners to plan and conduct workshops, gathering feedback from participants and refining the training program accordingly. The workshops included presentations of project results, discussions with external speakers, and live demonstrations to engage participants and disseminate project findings.

For the **1st EuReComp Workshop** that took place in Dresden, Germany, in parallel with other partners (**TUD, NTUA, HTWK**), a series of activities were planned and carried out, such as inviting other university staff and students to the workshop, presenting the first results of the project to the audience, creating a survey to collect the opinion of the audience regarding the workshop itself, the timetable, the content, etc. The event also included external speakers from other companies and universities and a public panel discussion on issues arising from the project. Finally, the first workshop ended with a guided tour and live demonstration by the host Institute of Lightweight Structures and Plastics (ILK-TUD).

WP7: Training & Life-long learning

The **2nd EuReComp Workshop** is organized by AIMEN. The event, taking place on the **24th of April 2024**, in Vigo, Spain, will consist of different parts: The first part will be dedicated to external speakers from industry and other universities, then it will continue with a round table, in the second part the latest results of EuReComp will be presented by the partners. KUZ has planned to show the latest update of the Moodle platform online and collect the audience's opinion with a survey to improve the structure of the lifelong learning platform and the content of the next workshops. The workshop will then end with a demonstration session at AIMEN facilities.

- **What's Next for WP7**

In WP7, we're advancing training and life-long learning initiatives.Completing content for the Moodle platform, including animations, and enhancing its structure is a priority. Moreover, we're preparing an overall concept for training and life-long learning. Lastly, we'll apply and optimize training concepts, collecting feedback for improvement.

Events / Conferences / Exhibitions

The EuReComp project team embarked on a journey to the beautiful Porto in Portugal, for our 18-Month Review Meeting.

EuReComp team successfully participated in JEC World 2024.

Taking part in the 1st National Competence Show: CIRCULAR.LIGHTWEIGHT CONSTRUCTION.EXPERIENCE. in Dresden, Germany

Introduced the EuReComp Webinar Series of 2024.

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Our Team

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48 months

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