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1 INTRODUCTION

The present document constitutes the Deliverable D1.4: “Overall work plan” in the framework of the STEP project entitled “Stone Technology for Eco-Efficient Production” (Project Acronym: STEP; Grant agreement no.: ECO/12/333123).

This document collects the detailed workplans for work packages 2 to 6, as prepared by WP leaders with the agreement of partners involved.

In deliverable D1.3, “Planning of actions and subactions”, a relationship of the tasks and subtasks as well as the duration of activities is shown to complete this working document.

2 WP2

2.1 WP OBJECTIVES

The aim of this WP is to develop two industrial single modules suitable for non-conventional processing of natural stone products based on a medium size lab-scale in-line prototype, developed by some of the partners. Important experimental variables have been set and adjusted using this laboratory equipment. However, such equipment still has to be scaled up and resized in order to reach the industrial processing requirements of the factories involved in the project where the industrial modules should operate.

The resulting configuration of the adjustment process should allow these two modules to be correctly adapted to the different industrial processes existing in the Natural Stone production chain.

2.2 TASKS

T2.1. DEFINITION OF TECHNICAL REQUIREMENTS FOR NATURAL STONE PROCESSING

The work to do has been split into two subtasks, as follows:

ST.2.1.1 Technical parameters definition of the industrial process

Operating parameters related to the drying and reinforcement stages in the natural stone industry will be defined. The reinforcement process involves the impregnation with resins and the resin curing using heating systems.

ST.2.1.2 Technical parameters definition for the industrial modules

Experimental parameters will be adjusted to optimize the behaviour of both modules.

TASK 2.2- PROTOTYPE SCALING UP FOR REINFORCEMENT OF NATURAL STONE PROCESSING

In this task the scale up of the prototype will be made in order to obtain two industrial single modules for in-line drying and curing of natural stone products.

These are the activities to carry out within this task:

ST.2.2.1 Detailed design and scale up of the new modules

A detailed design of the scaled up modules will be made considering the requirements of the process at factory level.

ST.2.2.2 Design and scale up of additional subsystems

For both industrial modules, the work for developing additional/ancillary subsystems, mainly mechanical and electrical, will be accomplished.

ST.2.2.3 System integration and validation

The integration of all the systems designed in previous subtasks will be done. Manufacturing of both industrial modules will be accomplished and the operation of both modules validated.

A supervision of the manufacturing process of both modules will be made. Validation and adjustments (if needed) will be performed to optimise the designs and to obtain the optimum curing results for the resins.

ST.2.2.4 Initial Type Approval elaboration

An initial type-approval process related to European Directive 2006/42/CE Machinery Safety and other regulations will be made. This process will be taken into account from the beginning of the industrial design tasks.

3 WP3

3.1 WP OBJECTIVES

The objective of this WP is to establish the optimal experimental conditions to obtain cured eco-resins as well as to get the epoxy formulations that best match the curing conditions.

In this task the following properties will be determined:

- Mass ratio resin – hardeners
- Additives
- Wt% Surfactant
- Wt% H₂O, ...
- Stability agents

Once the formulation that best works has been set, the characterization of properties of the resin to optimize the operation will be carried out by means of the following methods: viscosity, DSC, adhesion test, failure evaluation, and mechanical properties (hardness, abrasion Taber and tensile strength).

After fixing the chemical and mechanical properties of the resin, the optimal conditions for its curing will be identified. Later, industrial conditions will be optimized for working at factory level.

3.2 TASKS

Task 3.1 Resin formulation optimization and curing process definition

ST.3.1.1 Screening phase

Selection of the resin systems (epoxy, hardeners, water, surfactant, additives ...) and conditions of the resin (weight, temperature, chemical composition, etc.) will be conducted.

ST.3.1.2 Characterization tests

DSC analysis, SEM interaction marble-ecoresin, tribological properties, adhesion test and durability tests will be carried out.

ST.3.1.3 Data sheet and safety specifications preparation

The data sheet and safety specifications of the new eco-resins will be prepared, compiled and showed.

ST.3.1.4 Curing process

The parameters of the curing process in the industrial modules will be monitored and analysed.

4 WP4

4.1 WP OBJECTIVES

The objective is to adapt the eco-resins to the industrial modules as a process and their integration at factory level. The integration process will be optimized to replicate the industrial modules into industrial machines which will be tailored-made designs to operate in continuous as reinforcement stage in the natural stone factories. The manufacturing and commissioning of these production lines is out of the scope of the STEP project.

4.2 TASKS

Task 4.1 Integration of eco-resins and curing technology

The objective is to obtain an eco-friendly industrial processing system at module scale. As a result of this task, the curing integrated process will be completely designed at module scale.

Task 4.2 Implementation and full test

This task aims at adapting the industrial modules for their installation at two different places: a factory in Greece for the processing of strips and tiles, and a factory in Spain for the slabs processing.

Some of the activities to be carried out will be the integration of the eco-friendly system at module scale in the selected factories, the design of the needed ancillary systems and process modifications to adapt the industrial modules to the factories, and the compilation of optimum parameters to operate in the factories that process fissured materials, amongst others.

Furthermore, the documents required to obtain a sellable product within the European market will be prepared according to the European Directive 2006/42/CE about Machinery Safety, leading to the CE marking, as needed for the market uptake.

Task 4.3: Energy Assessment

This task aims at reaching two specific objectives: the adoption of a methodology to identify, define and estimate and assess energy flows in the natural stone processing plants, and the assessment of energy flows and environmental impact related to the processing of natural stone products using conventional and non-conventional processes.

Task 4.4 System sustainability and eco-efficiency indicators evaluation

The objective is to define specific *Key Performance Indicators* (KPIs) and to analysis them against the requirements and acquired energy data in the previous task.

5 WP5

5.1 WP OBJECTIVES

The business plan will be developed by setting the strategy for a feasible business from the project results. The exploitation plan will be drafted to establish the basis for the market uptake and the market replication.

5.2 TASKS

Task 5.1 Business Plan

ST.5.1.1 Market research: demand determination and benchmarking

The aim of the market research is focused on both the demand segmentation and the adaptation of the business strategies to the identified market targets, first by determining the market demand of the natural stone industry and, second, by performing a benchmarking action to collect information about the market characteristics.

ST.5.1.2 PEST Analysis

This subtask will deal with the analysis of the general environment surrounding the business activities to be carried out by the project consortium. The PEST analysis focuses on political-legal, economic, socio-cultural and technological factors affecting the business strategy.

ST5.1.3 Marketing plan and sales plan

The marketing plan will be prepared to be used to indicate the potentialities of both the market and the business strategy, by defining and by setting the objectives and targets to achieve, the strategy, the programming of the specific resources to be used and the functional and operative responsibilities.

The sales plan is a document where calculations about foreseen sales for a certain period of time are prudently established and it is used to define the more interesting scenarios in which the future market uptake and replication actions can take place. It is important to determine what it is expected from the market behaviour in the future.

ST.5.1.4 Economic-financial plan

This is the most important part of the business plan. It is an essential tool to analyse the economic and financial feasibility in both the short and mid-term of the business project. The two objectives to follow up are: first, to determine the required investments for the starting up and the future investments to do to allow the growth and consolidation of the business project and, second, to identify the financing sources both own and external to carry out the needed investments and to indicate the way of returning the external financing.

ST.5.1.5 SWOT Analysis

This tool allows facing an integral diagnosis of the business project situation and it is one of the main strategic tools to identify critical strategic factors.

The SWOT analysis must not remain as a simple description of concepts but it is required to set out the actions in order to take advantage of the opportunities through the strengths of the project, to decrease the weaknesses and to face the threats. It also has to serve as information source to generate strategic ideas and to set the basic objectives of the business project.

ST.5.1.6 Business plan

The business plan has to be an integrated document. The work to do will consist of covering at least the following points, complemented with the information gathered in the previous subtasks:

- Executive summary
- Description of the new product and distinctive value
- Potential market and study of the target groups
- Marketing and sales strategy
- Implantation plan and schedule
- Risks identification and contingency plan

ST5.1.7 Exploitation plan

The exploitation plan of the project results will have to include, at least, the following key points:

- Identification of the exploitation potential in the target markets
- Estimation of potential market defining the interested customer groups (internal or external)
- Necessary means to achieve the successful exploitation of the project results
- Economic exploitation
- Quantification of sales rising and profit increases or other important economic gains
- Exploitation strategies set-up

Task 5.2 Eco-labelling as a differentiation tool

This task is divided into 3 subtasks which establish the sequence for the eco-label award both in Spain and Greece.

ST.5.2.1 Tests for eco-labelling implementation

A new eco-label according to the framework of the EU rules will be made. A complete methodology will be defined, considering technical and administrative procedures. Necessary tests to define and quantify the technical procedures will be conducted (analysis of industrial activities in the natural stone factories: energy, waste and emissions).

ST5.2.2 Impact and marketing strategy for eco-labelling

The next points will be tackled: a) estimation of the eco-label impact in the natural stone market; b) design of a marketing strategy to make the eco-label attractive in the natural stone market.

A strong dissemination will be made to spread the eco-label amongst companies which show interest in the project results. This activity is linked to T6.4.

ST5.2.3 Regulatory framework study and eco-labelling in Greece

A study of the normative framework affecting the eco-labelling award will be made and a tool similar to Spanish's to extend the eco-label to the natural stone companies in Greece will be proposed.

6 WP6

6.1 WP OBJECTIVES

WP6 actions are focused on the efficient dissemination of the project results in order to assure the social and technological impact of the project.

6.2 TASKS

This task is composed of two groups of tasks: pre-defined tasks by EACI which are described in Annex I of the Grant Agreement, and specific tasks collected hereinafter.

T6.1. Establishment of a dissemination plan

ST6.1.1 Identification and classification of target stakeholders to be addressed

An identification and classification of the target stakeholders amongst the natural stone companies in Spain and Greece will be made.

ST6.1.2 Dissemination methods and associated activities (social media, logo, flyer, posters)

STEP project profiles will be created in social media (LinkedIn, facebook, twitter) and will be linked to the STEP project website. These profiles will be frequently updated with information regarding conferences, workshops and STEP project events. The logo is the main graphic identity element and it will be used in all documents and web pages related to the project.

A flyer to be distributed during conferences, workshops and during general project events will be prepared, providing a comprehensive overview of the project and including a brief summary of the main project objectives and characteristics.

Several information panels summarizing the activities of the project will be developed during the execution. Those panels will be created following advices of the Eco-innovation program and logos will be included. They will also include a complete list of the participating partners including their contacts. These posters will be used in workshops, conferences and other events as a presentation of the project.

T6.2. Dissemination of technical activities

ST6.2.1 Organization of technical days focused on dissemination of results for stakeholders

Three technical days (congresses) must be organized during the STEP project lifetime focusing on the dissemination of its objectives and results among stakeholders. It is suggested that one technical day will take place in Greece near the facilities of one of the natural stone producers involved in the project, inviting natural stone companies from all over the country.

ST6.2.2 Publications in specialized journals / announcements in specialized conferences

All partners are invited to contribute in this subtask. All published work will be gathered by WP leaders, and it must definitely acknowledge the STEP project and the ECO-INNOVATION platform.

T6.3. Dissemination among companies involved in the natural stone industry

ST6.3.1 STEP Website

The STEP project website will be developed before month 6. It should be noted that in the STEP website, not only passive information about the project should be presented, but also active interaction with potential stakeholders is required.

ST6.3.2 Merchandise

Gadgets (pens, agendas) will be prepared and distributed in the events and dissemination activities organized by the project. Also some roll-ups will be produced to illustrate seminars and workshops.

ST6.3.3 Press Releases – Newsletters

Newsletters must be prepared and be available at least two times, one in the middle and one towards the end of the project with respect to providing general information about the STEP project and also informing about emerging results, participation in events and organization of technical congresses. The newsletters will be uploaded in the STEP website and must be sent to partners' mailing lists. This way companies, universities and research centres interested in the project activities and potential end-users of the project results can be reached.

T6.4. Eco-label

The promotion of the eco-label among the different actors involved in the natural stone sectors will be an efficient tool to spread out the project results.