



LIFE 09 ENV/IT/000185

MDPATC

NEW ECO-PROCESS OF SUPERFICIAL TREATMENT
OF THE METALLIC WIRE PRODUCTS

Final pilot line: Functional details and photos

1. Description of the action

Objective of the present action was the realization of a demonstrative pilot line with a productive capacity of around 1000 kg/h of iron products, such as drawn wires, to be used to implement tests and to define the mass, energetic and environmental balance of the proposed solution; the pilot plant will be used also for the final characterization and tests of the products treated. The tested materials will be compared with products manufactured with standard manufacturing processes.

In order to achieve the results before mentioned, Trafiliera e Zincheria Cavatorta has implemented the following actions:

- Layout and optimization of the pilot line;
- Assembly of the pilot line and building of auxiliary systems;
- Functional tests on different products, changing the treatment parameters.

The pilot line is composed by the innovative systems developed assembled together, in particular:

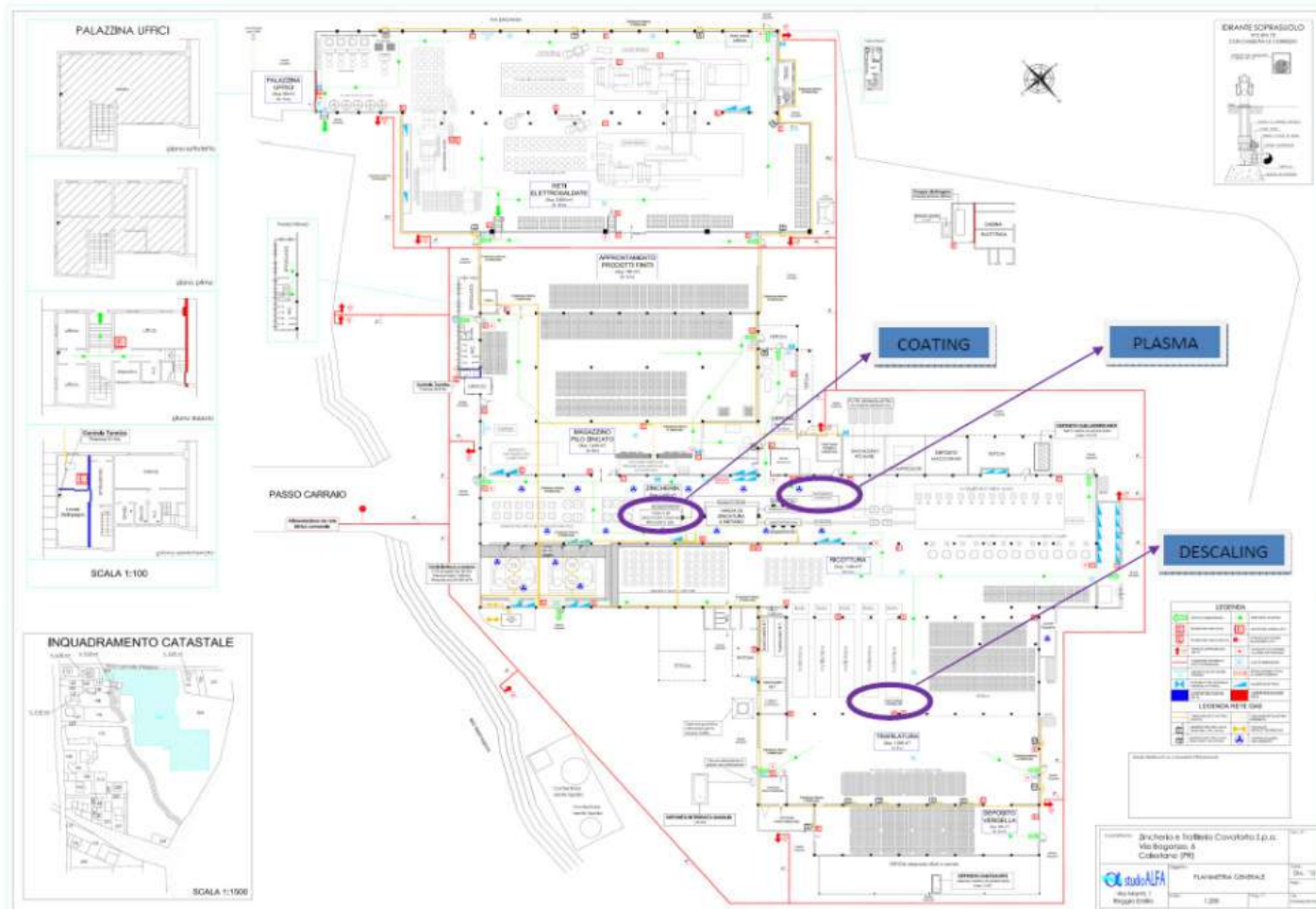
- Mechanical descaling;
- Microwave plasma applicator;
- Dip coating bath “Zn-Al-Mg”.

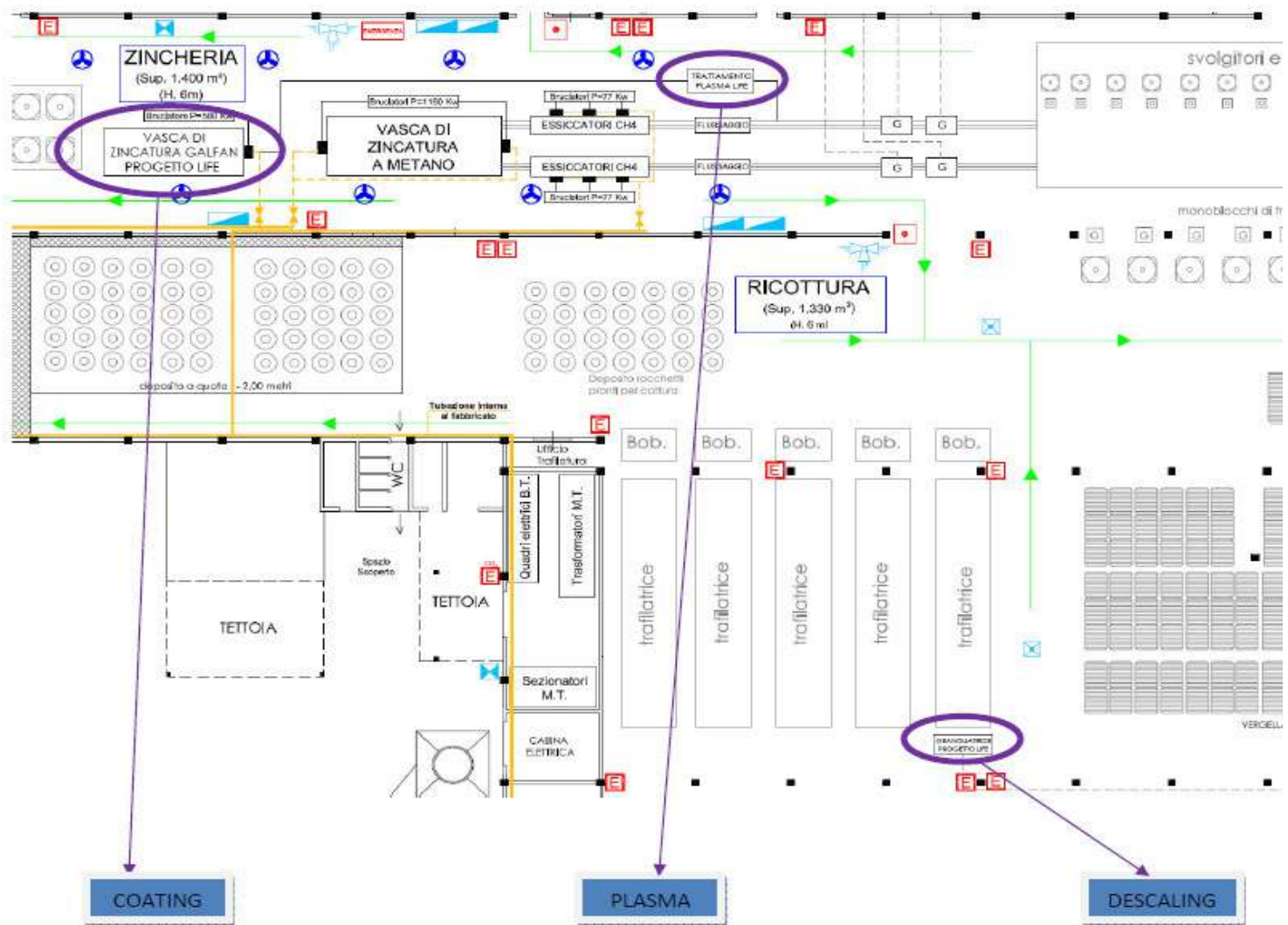
The line developed is defined as semi-continuous since the first innovative equipment (mechanical descaling system of the wire rod operating through shot blasting) operates in the first phase of the treatment, after it other treatment are involved which are not part of the present project (wire-drawing and annealing).

The system which operates with microwaves and plasma has been installed in line between the firing phase and the entrance in the bath coating with the new alloy Zn-Al-Mg, substituting the pickling phase.



2. System design





3. Objectives achieved

Once the pilot plant has been designed and built the innovative systems, which represent the innovation of the project, Trafiliera e Zincheria Cavatorta's staff dealt with the building of the final prototype.

In order to achieve this goal, the different systems have been connected in line: the mechanical descaling, the equipments for the generation of plasma microwaves and the dip coating bath, together with the necessary accessorize systems needed for the correct operating of the line.

The subsequent action was the beginning of tests in order to define the characteristics of products developed and the mass and energy balance of the system.

The results achieved appeared very positive, both for what it concerns environmental aspects and physical-chemical properties of the products developed.

The pilot line has been able to show that through the new system it is possible to achieve the following advantages:

- Reduction of the energetic consumption during the mechanical descaling and the hot zinc coating phases;
- Total elimination of water consumption (-100%);
- Total elimination of dangerous waste (-100%);
- Total elimination of toxic emissions in the atmosphere deriving from acids use (-100%);
- Reduction of toxic emissions deriving from Zinc hot dip coating and Zinc waste produced;
- Valorization of metallic waste in the mechanical descaling phase;
- Improvement of the working environment.

Beside the environmental benefits above mentioned, also technical-economical benefits are achievable:

- Reduction of Zinc consumption;
- Improvement of the quality of the finished product (physical properties);

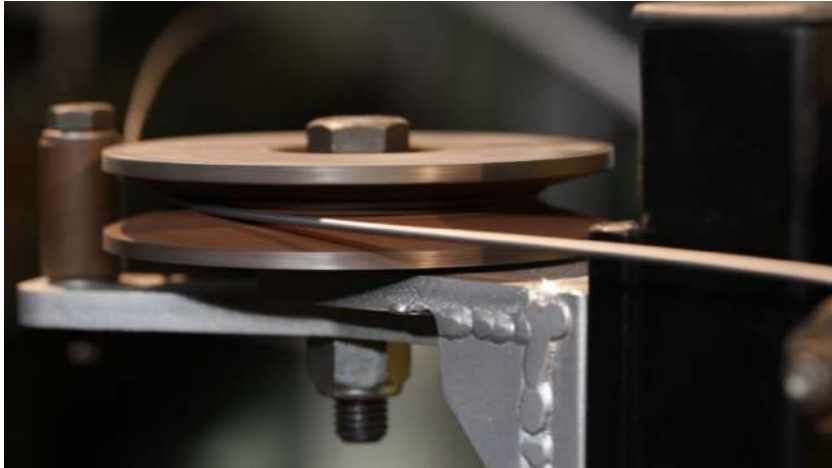
4. Pictures of the complete plant



Dip coating system – Zn-Al-Mg



Microwaves generator



Wire treatment



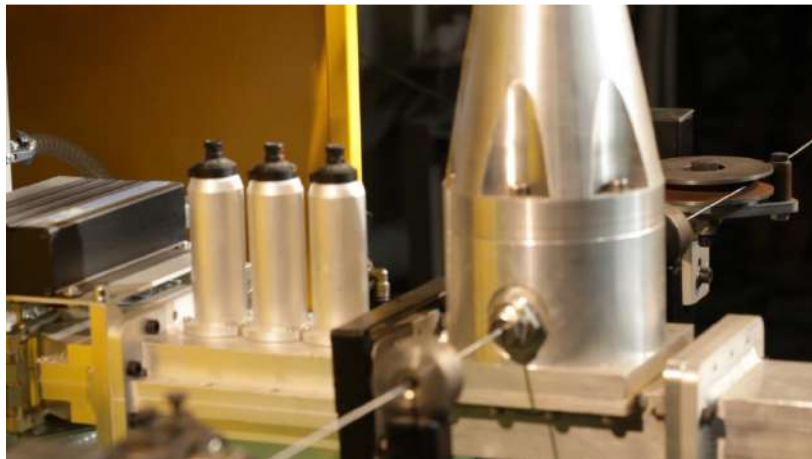
Wire treatment



Plasma torch



Plasma torch



Applicator of plasma microwaves



Final pilot plant



Metallic wire treated with the new process "MDPATC"