The goal of this project is to propose methods to sustainably clean debonded surfaces or dirty moulds used for plastics manufacturing. In parallel, the potential of these methods to activate surfaces to ensure a good adhesion will be evaluated. Using these methods should result in reducing the costs and in increasing the life span of plastic-manufacturing equipment and in bringing more understanding in mechanisms governing the adhesion. The project will focus on requirement of plastic manufacturing and joining technologies.

Different methods such as ultrasonic, CO2 ice, plasma treatment, sandblast, blast cleaning with walnut hull and waterjet cleaning will be investigated.

Problem to solve/Innovation:

Processes governing the adhesion of a polymer on another polymeric or metallic surface are not well understood yet. This has consequences in plastic manufacturing or in bonded technology, since either surfaces with a poor adhesion are required between a mould and its plastic counterpart, or inversely, a good adhesion properties are required between a surface to be bonded and an adhesive. Robust methods have to be proposed in order to sustainably clean surface and to activate surface.

Goals:

The goal of this project is, to propose methods to sustainably clean debonded surfaces or dirty moulds used for plastics manufacturing. In parallel, the potential of these methods to activate surfaces to ensure a good adhesion will be evaluated. Using these methods should result in reducing the costs and in increasing the life span of plastic-manufacturing equipment and in bringing more understanding in mechanisms governing the adhesion. The project will focus on requirement of plastic manufacturing and joining technologies.

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Budget and project duration

- Estimated full budget: ~150'000 CHF
- Financial plan for all industrial partners:
  - Global cash contribution: 30'000 CHF
  - Global material and tests costs: 15'000 CHF
- Minimum number of industrial partners in the project: 3
- Estimated duration of the project: 18 months

Main deliverables:

- Development of sustainable cleaning and surface activation methods, documented in reports.
- Cases studies based on typical materials of the plastic manufacturing industry and joining technology

Example of:

Upper pictures: surface activation with plasma treatment
Lower left picture: measure of the surface wettability
Lower right picture: surface to be cleaned