



Optimizing all aspects of the painting process

Image source: Adobestock/Junrong

Challenges

In recent years, coating technology has developed into a production step that is both cost-intensive and difficult to control. High energy costs and past and future investments in environmental protection are jeopardizing the competitiveness of paint-processing companies. Added to this is considerable price pressure due to the current general economic situation.

Coating technology is a particularly energy-intensive process which is heavily affected by rising energy costs. Optimizing energy consumption, processes and quality therefore play a key role for all coating companies.

End-to-end support to optimize your process

Optimizing the painting process and the paint shop is a constant and holistic process. A particular focus is on opportunities and potential for improving carbon neutrality, energy and resource efficiency, sustainability and measures to prevent painting

defects. If a company wants to keep up with the competition, continuous improvements are essential.

The Painting Process Engineering team at Fraunhofer IPA sees itself as a **developer of solutions for paint processing companies** and as a partner for overcoming challenges associated with manufacturing or processing. Over 50 years of project experience with painting companies and complex painting processes form the basis for our cooperation with industrial customers in a wide variety of project formats. To optimize paint shops and processes, the project team has access to a wide range of methods, specially-developed software tools and extensive testing and measuring equipment in state-of-the-art test laboratories.

Our approach

Fraunhofer IPA takes a systematic approach to optimize processes from the customer's perspective. One of the methods used is Lean Six Sigma – a combination of Lean Management

and the Six Sigma method. The aim of lean management is to make the value chain and thus the entire process effective and efficient. This avoids any kind of waste from the customer's point of view. The following principles and objectives are essentially pursued:

1. Customer-oriented production
2. Identification and analysis of processes and sub-processes
3. Consideration of the flow principle and avoidance of bottlenecks and overproduction
4. Introduction of the pull principle, i.e. the provision of services when requested
5. Continuous process improvement

The Six Sigma method involves improving the quality of processes as part of the so-called **DMAIC cycle**:

DEFINE – MEASURE – ANALYZE – IMPROVE – CONTROL.

Each of these project phases is supported by tried- and tested tools.

1. Process evaluation

In order to assess the process correctly, a project team is first formed from the company's technical stakeholders and Fraunhofer IPA's experts. The first step is to record the current situation. The following aspects are considered:

- Composition of the parts spectrum
- Arrangement of parts on product carriers (conveyors)
- Description of the material flow in the paint shop
- Paint and process specifications
- Characteristics of the coating properties
- Characteristics of the paint application process
- Costs for the coating process
- Current requirements

2. Weak point analysis

In the next step, a weak point analysis is carried out on site to identify where there is potential for improvement. This also includes measuring condition variables such as:

- Spraying parameters
- Paint utilization rate
- Paint shop capacity
- Air conditions in the spray booths
- Material flow
- Required structure of the paint layer
- Thickness and distribution of the paint layer
- Energy analysis
- Rework statistics, reject rates

3. Result

A detailed catalog of requirements and a trend analysis emerge from the process assessment and weak point analysis. The catalog defines decorative and functional requirements for all parts and specifies the boundary conditions for the paint shop and painting process. The trend analysis takes into account

anticipated future developments, e.g. with regard to coating quality, parts spectrum, colors or paint structures, as well as environmental protection requirements.

The result of the optimization project is a catalog of measures. This includes priorities, time targets and expected savings potential. To implement the measures, systematic trials are carried out with all project participants and the achievement of objectives is monitored.

Optional project services:

- Monitoring the implementation of measures (PDCA cycle):
Plan, Do, Check, Act)
- Experimental tests in the Fraunhofer IPA pilot plants and laboratory facilities
- Development and execution of customized training programs

Take advantage of Fraunhofer IPA's expertise and infrastructure to optimize your painting processes! From all aspects, or just a specific point in the process. We are at your side as an unbiased and experienced partner.

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