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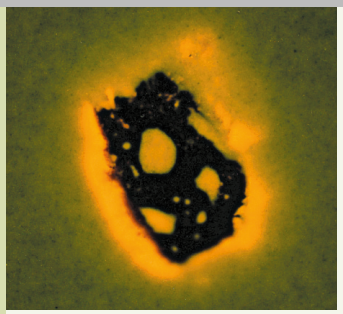
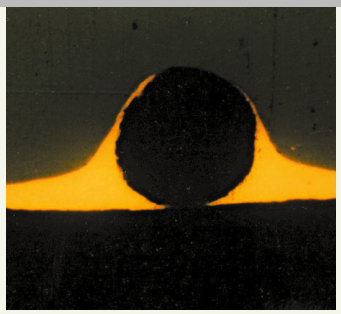
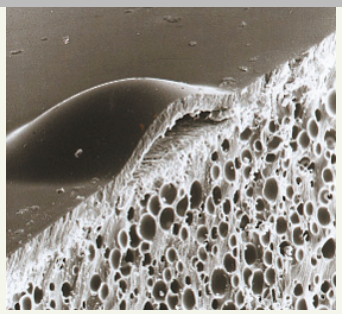


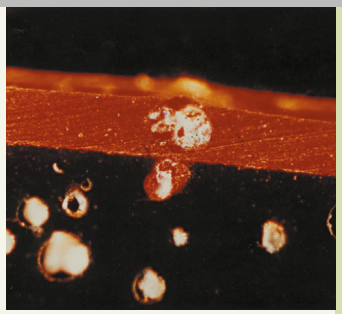
Crater



Welding bead



Paint bubble on polyurethane foam part



Pores in polyurethane foam part

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1 *Examples of defects.*

AVOIDING PAINTING DEFECTS

Status quo

In many paint shops, painting defects (Fig. 1) are the cause of high reworking rates and reject rates. Complaints lead to expensive repairs and an image loss. Both result in major expenses and reduced competitiveness.

We can help

To avoid or at least reduce the number of painting defects and complaints, we analyze and optimize all your production steps from the economic point of view. In doing so, we use recognized methods and test equipment. The possible causes of defects and weak points that result in rework in the paint shop are not limited just to the paint shop area itself. These can arise even before the start of the painting process, e.g. during the production of the parts concerned or their assembly before being processed (Fig. 1).

Through the interaction of the causal factors combined with unacceptable fluctuations in quality, high levels of error carry-over and error accumulation can arise, even in the case of minor process deviations. The reliability of the painting process is no longer guaranteed.

Our approach

Based on a recording of the status quo, we analyze the weak points in your paint shop. We employ empirical and analytical investigation methods to locate and characterize defects, weak points, sources and causes of error and their impact. We mainly apply the empirical investigation method. The complex and expensive analytical investigation methods support the empirical weak point analysis. This enables us to identify the causes of defects that are not obviously analyzable but which impair the quality or efficiency of the production process.

In a relatively short preliminary investigation phase, we first identify the obvious weak points and errors that can be eliminated quickly at low cost. Our main priority is

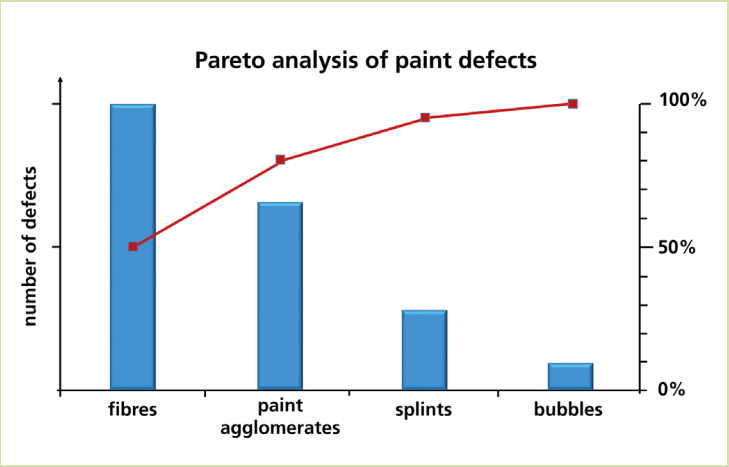
Fraunhofer Institute for Manufacturing Engineering and Automation IPA

Nobelstrasse 12
70569 Stuttgart | Germany

Dr. rer. nat. Volker Wegmann
Phone +49 711 970-1753
volker.wegmann@ipa.fraunhofer.de

Dipl.-Ing. (FH) Dirk Michels
Phone +49 711 970-3733
dirk.michels@ipa.fraunhofer.de

www.ipa.fraunhofer.de/en



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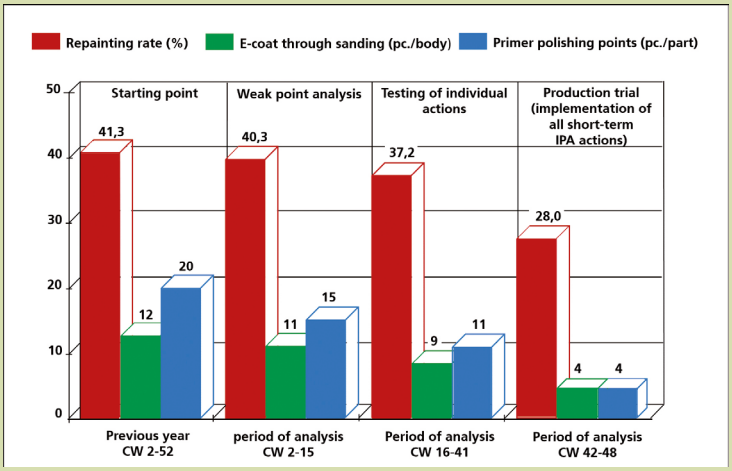

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to eliminate the most serious weaknesses as fast as possible. We conduct counts to identify the frequency of the various types of defect. The weak point statistics carried out in this way highlight the key areas for optimization. Based on the characterizations of the weak points, a catalog of measures is drawn up in cooperation with the relevant departments and the priorities, responsibilities and deadlines for planning these measures are determined. As a result, before starting the time-consuming general investigation, in a team you have the chance to work out, test and introduce measures that can be implemented in the short term to initially stabilize the process.

In the general investigation, we go into every fault in detail. Extensive defect counts in the painting area are very helpful in this respect. The counts can be structured in accordance with the production step concerned. This ensures that the types, causes and summations of defects are recorded as a representative cross-section. Only with a sufficient evaluation period is it possible to assess the relationship between defects and time. In cooperation with the respective departments, we then use the meaningful results from the error analysis to compile a catalog of measures, define the priorities, responsibilities and deadlines for planning these measures and calculate initial costs.

Even tiny defects in the paint film are very obvious and lower the perceived value of high-quality products. However, the small size of the various defects in the paint film often makes it impossible to attribute them to a specific cause without further investigation. For this reason, defects that cannot be analyzed visually should be analyzed in the laboratory (e.g. microscopy and chemical analysis). Here, however, only specific defects should be selected, i.e. those affecting rework.

The "outer" surface of a defect can be ascertained by examining the sample with a pocket microscope or simple light microscope. This enables us to identify the defects with a pocket microscope directly at production line level. Numerous methods are available for analyzing defects, most of which are highly complex. Their effectiveness and value of the information obtained must be assessed in each case individually. Defects can also be analyzing in other ways:

- by taking samples of company-specific sources of dirt from the production process, e.g. conveyor abrasion, paint overspray particles, etc., for analytical comparison and
- by performing simulation tests on the characteristics of defects in the laboratory.

2 *Pareto analysis.*

3 *Changes in the rework rate in the course of the project.*