

FABRIC DAMAGE ANALYSIS

Flaw analysis on textile fabrics

TASK

In the case of textile fabrics, for example, soiling, adhesion problems and damage can lead to complaints. If such problems occur, it is essential to find the cause.

SOLUTION

Analytical Services Obernburg often uses scanning electron microscopy (SEM) in such cases. This provides images of high resolution and depth of field. In conjunction with X-ray microanalysis (EDX), it also allows the elemental composition (EDX) of the smallest areas of the defects to be characterized.

Industries

Fiber manufacturers
Weaving mills
Coaters

Objectives

Damage analysis

Materials

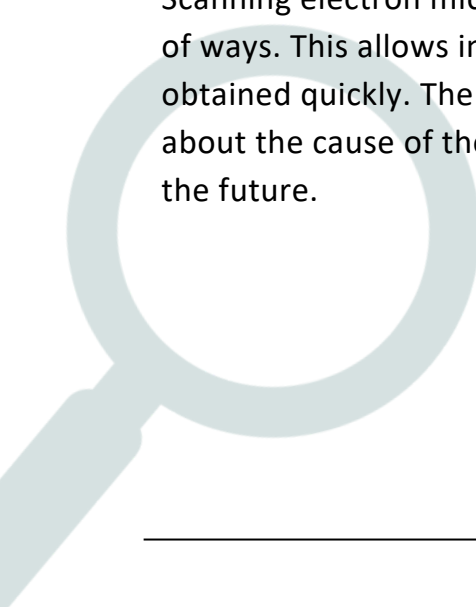
Fabric

Analysis methods

Scanning electron
microscopy
(SEM-EDX) Light
microscopy

ADVANTAGES

Scanning electron microscopy can be used to examine flaws in textile fabrics in a variety of ways. This allows information about their topography and element composition to be obtained quickly. The results obtained in this way often allow conclusions to be drawn about the cause of the defect, from which solutions can be derived to prevent defects in the future.



EXAMPLE - FABRIC WITH DARK STRIPES

The dark stripe in the fabric was caused by inorganic contamination in the form of tiny particles (shining brightly in the material contrast image). This contamination only affects one thread; the cross threads are not affected. It can therefore be assumed that the contamination was applied to the thread before the weaving process. Precise elemental analysis of the contamination (EDX) provides information about the composition of the particles. According to this, rust particles (Fe/O) are responsible for the discoloration

EXAMPLE - IRREGULAR SURFACE WITH COATED FABRIC

A PVC-coated fabric sample shows pockmark-like elevations on the surface. A cross-section was made through one of the defects and examined under a scanning electron microscope. A cavity within the PVC coating is clearly visible. At the same time, PVC residues can be found on the fabric, so that poor wetting of the fabric can be ruled out as the cause. In the material contrast image, the penetration of the PVC into the thread composite can also be studied, which provides information on the existing adhesion mechanisms.

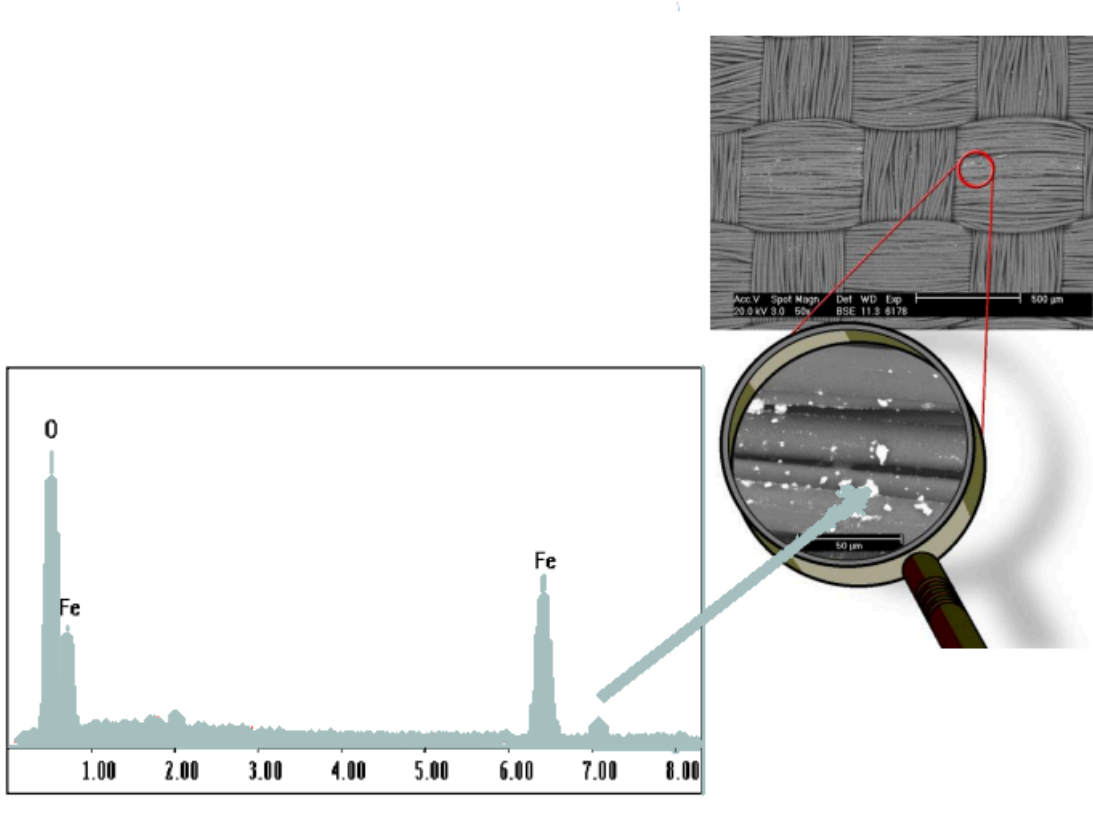


Fig. 1 Example - Fabric with dark stripe

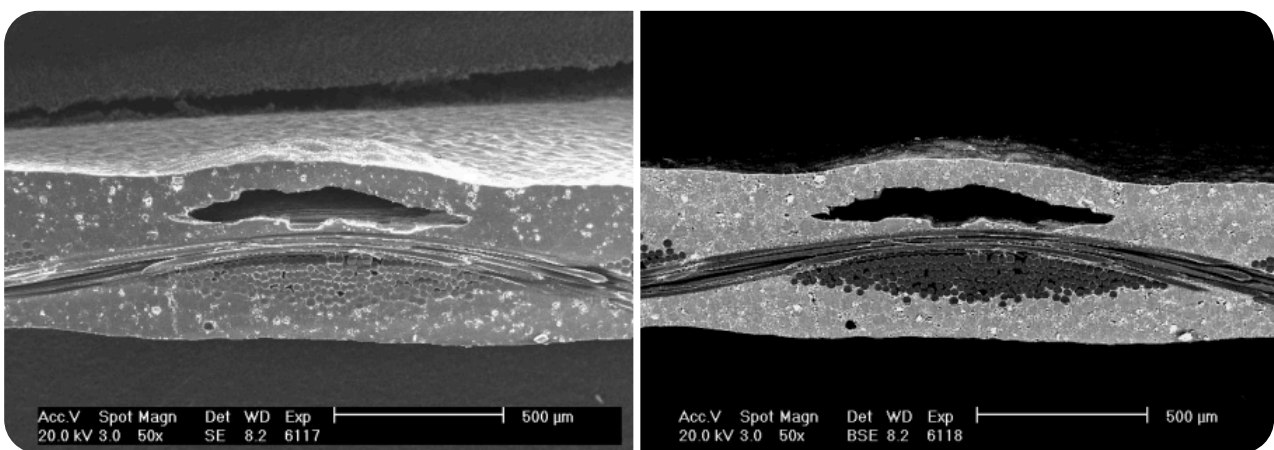


Fig. 2: Scanning electron micrographs of the topography contrast (left) and material contrast (right) of a PVC-coated fabric in cross-section.