

## **Interest in advanced microscopy for the failure analysis of metallic components.**

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### **Abstract**

Failures happen when factors interact in unexpected ways. It is important to understand the origins of the in-use failure of metallic compounds to avoid them further. Various instruments can be used to characterize materials and to evaluate failure processes. Some are basic and relatively cheap but essential, such as X-ray fluorescence to ascertain the chemical composition of the material, optical microscopy to study the microstructure of the materials and the fracture surface, and hardness to assess the mechanical properties of the part. Some are costlier but give important information on the failure modes such as digital microscopy and electron microscopy (SEM).

During this presentation, we present two cases of failure and the results of our examinations to explain their causes, emphasizing the interest in using SEM and digital microscopy. The selected cases are (1) pipes coming from copper pipes supplying water to water/air exchangers from a dehumidification circuit and (2) wear strips used in steel casting machines.

Keywords:

Failure, ferrous alloys, instruments, practical cases