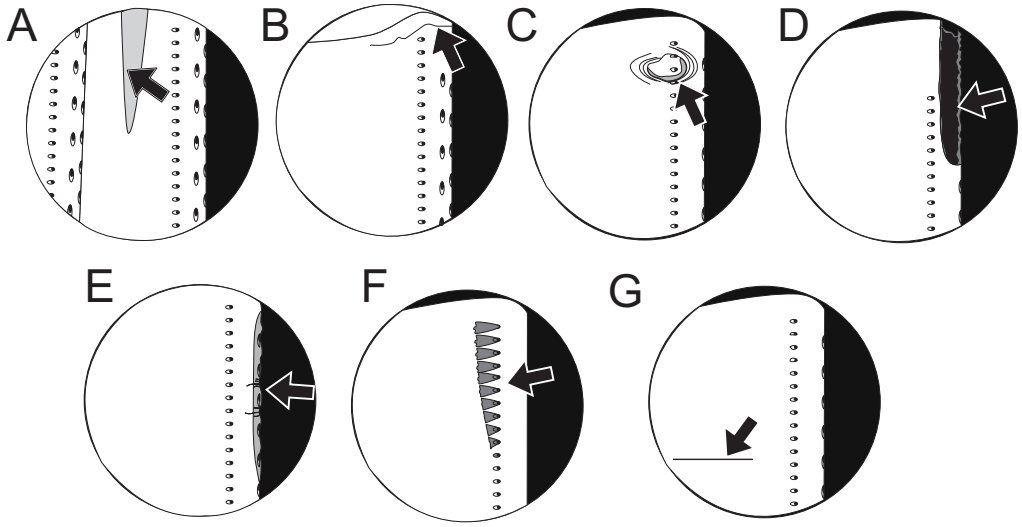
To find and identify the failures are a precondition for a successful diagnosis and therapy.



Ill. 4.1-7

Ill. 4.1-7: *Some typical pictures of* ***high pressure turbine blades****, as the examiner views in the* ***borescope****, are represented as examples (see also Lit.4.1-4 and Lit. 4.1-5).*

"A": *Local* ***oxidation damage****, also in connection with* ***hot gas corrosion****, in the area of a component specific* ***hot spot****, where the film cooling air is insufficiently effective. The protective* ***diffusion coating*** is here already consumed, *the base material becomes visible.*

"B": *Typical* ***thermal fatigue crack*** *with delayed crack growth (Ill. 3.3-9) on one guide vane in the* ***transition to the outer shroud****.*

"C": *OOD (****Impact*** *through* ***internal foreign objects****) on a rotor blade (secondary failure see "D" in Ill. 3.3-10). Typical for the turbine is the area on the suction side of the leading edge region. Foreign objects in the high pressure turbine are, e.g.,* ***coke particles*** *from the combustor (carbon impact) or released ceramic particles from the* ***thermal barriers*** *(Ill. 3.2.3-4).*

"D": Burnt leading edge *("E") in the tip region of a turbine rotor blade without shroud. Cause of the over temperature can be an inner* ***blockage of the cooling air hole*** *(e.g., a closed dust removal opening) or a narrowing of the cooling air hole, as a consequence of a deformation (OOD, "C").*

"E": *Heavy* ***oxidation*** *(burning) and thermal fatigue cracks on the leading edge of a turbine blade. This typical appearance at local over temperatures is also called the* ***orange peel effect****.*

"F": *Turbine rotor blades from which foreign material, e.g.,* ***labyrinth or abradable abrasions*** *from the compressor (Ill. 3.1.2.4-4), emerges out of the film cooling holes and melt.*

*„****G****":* ***Black line*** *on direction of the flow can originate from coked oil and is in this case not dangerous. But if it is a matter of an internal crack,* ***originated from the cooling structure of the blade*** *(Ill. 4.1-5) a fracture of the blade must be expected.*