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PowerCurve

AeroVista damage severity guide

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1 Introduction

This document is a guide for filling the input Excel file for AeroVista Web, the software developed by PowerCurve for investigating aerodynamic performance changes due to blade surface degradation and their impact on Annual Energy Production (AEP).

2 Blade surface degradation

The blade surface can be degraded due to various reasons like erosion, dirt deposition, bugs, ice, Leading Edge Protection peeling off, etc. This leads to an uneven surface for the flow over the blade and has a negative impact on the aerodynamic performance. The impact of degradation worsens farther out on the blade, because of higher local velocities and higher power contribution from those sections.

3 Different levels of degradation

This section describes the different levels of blade surface degradation to simulate and analyse the impact of damages on AEP.

3.1 Severity 1

This is a mild level of degradation, caused mainly by small individual pits and light dirt deposition/bug impacts. If the surface of the blade section looks like Figure 1 or Figure 2, the severity level should be set to 1.



Figure 1 - Small pits



Figure 2 - Light dirt/bug impact

3.2 Severity 2

This is a slightly higher level of degradation, caused by distributed shallow pinholes, medium dirt deposition/bug impacts or the LEP starting to peel. If the surface of the blade section looks like Figure 3, the severity level should be set to 2.

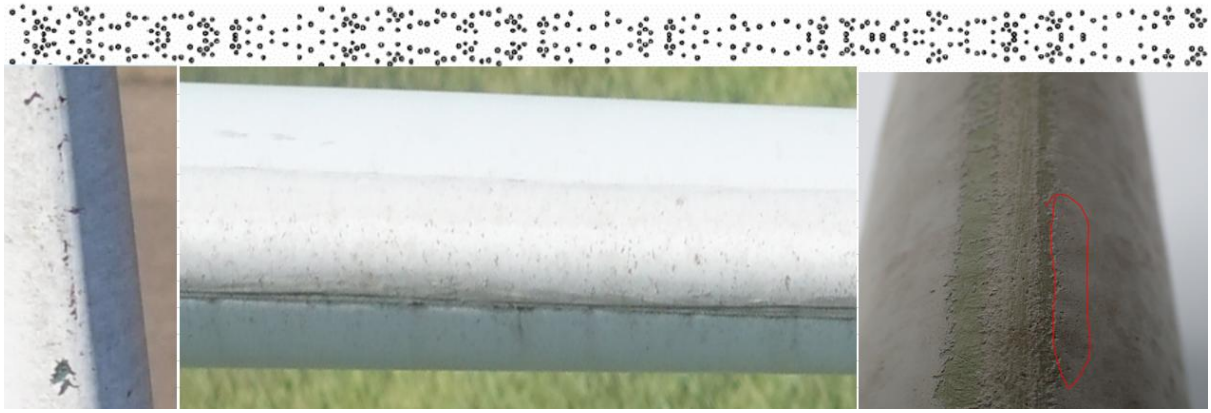


Figure 3 - Distributed pinholes, LEP peeling off, medium dirt/bug impact

3.3 Severity 3

This is a higher level of degradation caused by shallow pits starting to merge and form small patches, heavy dirt deposition/bug impacts or the LEP having peeled off. If the surface of the blade section looks like Figure 4, the severity level should be set to 3.

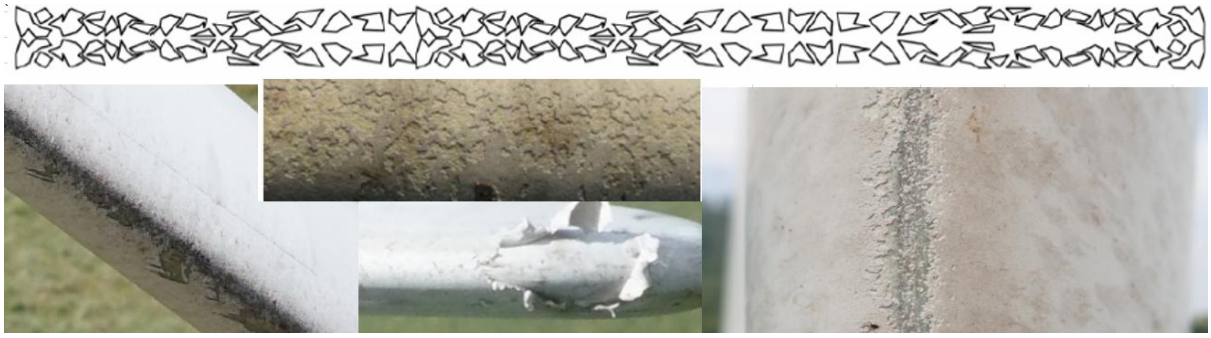


Figure 4 - Small patches, heavy dirt/bug impact, LEP peeled off

3.4 Severity 4

This is a severe level of degradation, caused by extension of the damage further from the Leading Edge and a mixture of shallow and deep damages. If the surface of the blade section looks like Figure 5, the severity level should be set to 4.

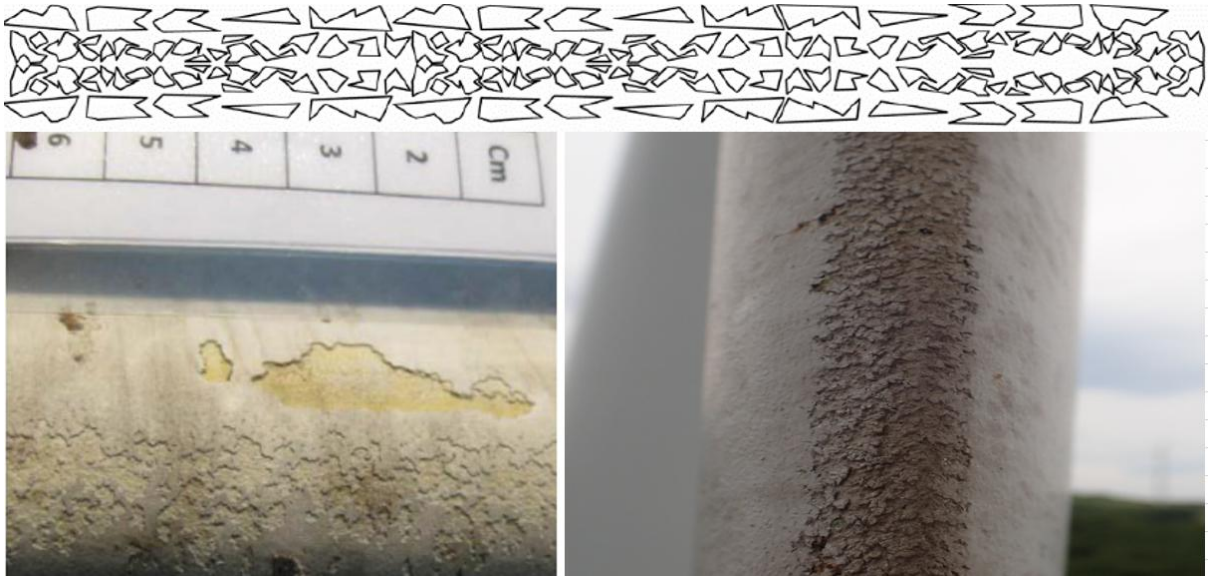


Figure 5 - Extended and deep damage

3.5 Severity 5

This is a very severe form of degradation, caused when there is no paint/gel left, exposing the bare laminate. This level is characterized by a defined step, and if the surface of the blade section looks like Figure 6, the severity level should be set to 5.

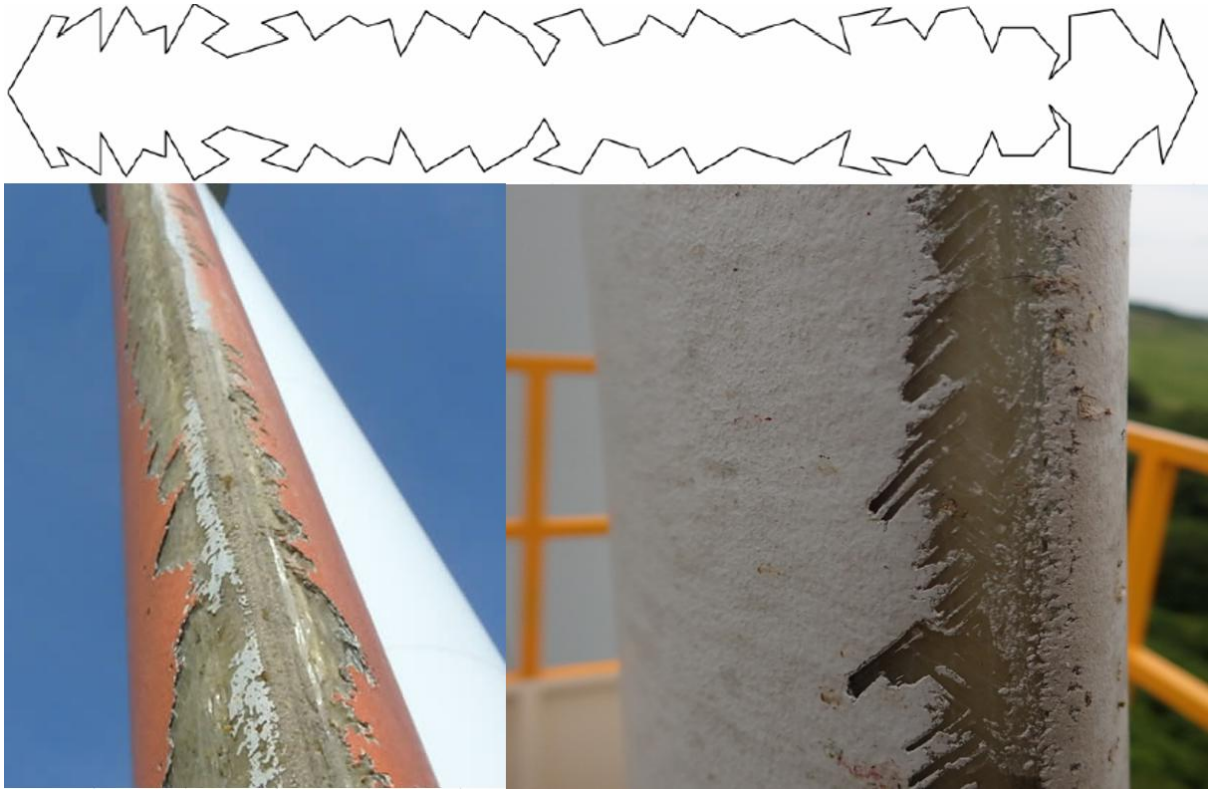


Figure 6 - Bare laminate exposed with a defined step