Example No. 5: Modeling of mechanical erosion to better predict surface durability and to create longer-lasting coatings

Understanding mechanical erosion, such as solid-body or water-droplet erosion, is a major factor in the design of equipment and components used in the transportation and energy industries. Mechanical erosion of aircraft fuselage surfaces, wing surfaces, jet turbine blades, automobile valves and pistons, power-generating steam turbines, etc. can result in significant performance losses, reduction in service life, and serious operational failures.

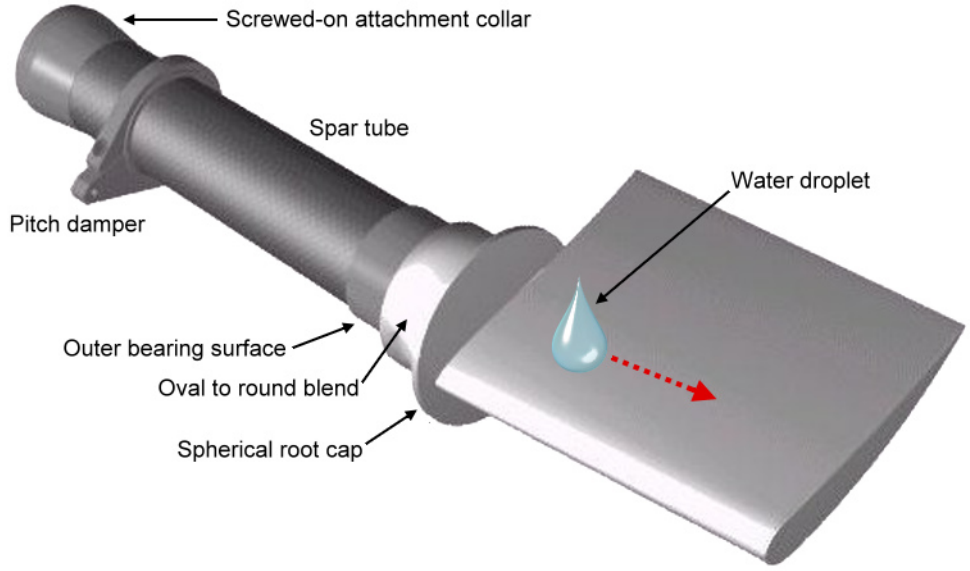

Figure 1: Carbon/epoxy rotor blade

A crucial element in understanding and predicting surface damage caused by mechanical erosion is the proper analysis of the impact of single particles or droplets. This can easily be done using SIO software, which was used to generate the graphical output below related to the rotor component shown in Figure 1 above. With SIO software it is even possible to model simultaneously impacting particles to better understand their combined effect on the surface coating, whether it be a single or multi-layered material.