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PROTECTIVE COATINGS AND SURFACE ENGINEERING FOR TRIBOLOGICAL APPLICATIONS IN THE ELECTRIC POWER INDUSTRY

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The majority of electrical networks around the world are aging and power losses due to wear, erosion, cavitation and corrosion require increasing investments from utilities. The need for extending the operating life of power generation equipment and to transit more energy from existing infrastructure calls for the development of more efficient protective coatings. After reviewing some of the problems encountered during operation of typical high powder hydro-turbines, this talk will present some recent development in surface engineering to improve specific components of these electrical equipment. The first part will discuss Babbitt coatings for thrust bearings made by thermal spray and the problems associated with excessive porosity. The second part will concern degradation of turbine blades by cavitation erosion and synergetic effects when corrosion and cavitation occur simultaneously. Finally, after discussing degradation mechanisms in several metal-ceramic composite protective coatings, new methods will be presented to design specific microstructures with improved tribological properties.