

Material challenges of steam turbine blades operated in wet steam region - part 2

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Abstract:

Water droplet erosion of the steam turbine blades is one of the serious problems affecting lifetime of steam turbines. Last stage blades operated in wet steam region are exposed to erosion degradation which causes serious problems affecting lifetime of steam turbines. It is crucial understand an erosion process and testing and modelling of the erosion resistance of various materials has key importance in choice of proper materials for steam turbine blades (steels and Ti alloys). Suitably chosen material or proper surface treatment of the material can minimise risk of damage and increase lifetime of the steam turbine. Doosan Škoda Power disposes with unique erosion rig providing close simulation of liquid droplet erosion process. Based on the experimental testing of erosion resistance of various materials, erosion model providing prediction of the material volume loss of the blades operated in wet steam has been created. The erosion model is used to analyse the erosion damage prediction and lifetime estimation of the last stage blades. Doosan Škoda Power is focused on development and testing of passive erosion protection as a laser hardening, Physical and chemical vapour deposition, stellite laser cladding.

Key words:

Water droplet erosion, erosion protection, blade materials