

Impact of health indicators on maintenance management and operation of power systems

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Abstract— This paper proposes a maintenance management and risk reduction (MMRR) approach. The approach introduces two reliability-based indexes called condition indicator (CI) and risk indicator (RI). CI is a unit-less parameter that comes directly from monitored condition of a component and converts the categorical condition into a numerical value. RI in mega-watt represents the risk imposed by the health of a component onto the system. To demonstrate application of the indicators, they are implemented through an hourly network constraint unit commitment problem and applied in a test system where the analysis of impact of condition of the generators to the operation is the new contribution. The results demonstrate how addition of such indicators will impact the operation of the grid and maintenance scheduling. The results show the benefit for the system operator as the overall failure risk in the system is taken into account; and the benefit for the asset owner as the direct impact of the maintenance to be carried out can be investigated. Two of the main outcomes of the MMRR approach are: asset owners can analyze their maintenance strategies and evaluate their impacts in the maintenance scheduling; and system operators can operate the grid with higher security and lower risk of failure.

Index Terms— Maintenance management, Condition monitoring, Health indicator, Risk reduction, Power system operation

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