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Structure-borne sound diagnosis for generating units enhanced by the Cepstrum method

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Abstract
Structure-Borne Sound (shortly SBS) is the physical phenomenon of acoustic wave propagation within a solid body. This means the same vibration characteristic excited at any point of the body can be measured at any other place of the body. That phenomenon can be used to provide an "intelligent" stator core vibration module for continuous online monitoring of the stator and its components. The stator core represents a solid body.

Based on that philosophy Andritz hydro GmbH (formerly VA Tech Hydro GmbH) has developed an SBS Diagnosis module, which helps to detect loose stator components in an early stage. Loose stator components, in particular loose winding bars are the source of dielectric problems in insulation material in many cases. Undetected failures can lead to expensive secondary damages.

15 years ago VA Tech / Andritz hydro's engineers designed an SBS Diagnosis module consisting of one or more vibration transducers, fast data acquisition equipment and a highly sophisticated computer-aided software package. The engineers intended to provide an intelligent tool, which is able to generate informative messages in case of detected stator component problems automatically, and which is embedded within a comprehensive condition monitoring concept for generating units. Over the time the SBS Diagnosis module has been proven as a promising diagnostic tool as a stand alone version and as an appropriate Supplement to partial discharge respectively ozone monitoring systems as well.

The long-term experiences of the SBS Diagnosis module showed that the idea using the SBS phenomenon is on the right way, but it also revealed the perception that less distinctive failures cannot he detected so easily in an early stage. This was the incitement for the engineers to find a solution, which is able to improve the already existing concept.

The solution is the implementation of the "Cepstrum Method".