

# **Diagnosing Unbalancing Gas Turbine Rotors**

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## **ABSTRACT**

The usage of naval gas turbines requires a professional technical supervision. Crews of small ships that are mainly provided in the Polish Navy can not fulfil such a requirement. Therefore, it was decided to support the crews of such vessels by the „Base Diagnostic System of Naval Gas Turbine Engines” (BDS) which was made in the Institute of Construction and Propulsion of the Vessels of the Polish Naval Academy.

In the paper results of vibroacoustic research on balance control of gas turbine rotors and assessment of their permissible operation times are presented. 1241 RE missile corvettes, which are fitted with COGAG gas turbine propulsion systems, are subject to a permanent basic diagnostic system. The investigations were based on the following assumption: If technical state degradation of gas turbine rotor sets is a function of their operation time (at a load spectrum assumed constant) then it is possible to select from the recorded vibration signal spectrum such parameters whose changes can be unambiguously assigned to the operation time. Application of the proposed approach makes managing the engine’s operation time much more rational, especially at its end. The proposed approach is non-invasive and does not require taking the ships out of service. Realisation of investigations of the kind makes it possible to collect data for a database of the future monitoring system of ships, expected to improve their operational features. Applied diagnostic method is one of the element the „Base Diagnostic System of Naval Gas Turbine Engines” used by the Polish Navy. This diagnostic method of the gas turbine engines brings many advantages on the economical and reliability fields. It is one of the most important tasks of the exploital policy in the Polish Navy.