

Title: *Torsional vibration reduction device for twin propulsion engine installations on vessels*

Abstract: *The torsional vibrations acting on a ship hull caused by the propellers of twin engine installations cannot be mitigated by on-engine vibration compensators. Of particular influence is the crank angle difference – the phase angle - between the twin engines. Peak vibrations occur at different phase angles according to the engine speed which can lead to torsional vibration issues. Conversely, at different engine speeds, there exist phase angle ranges for which the torsional vibrations are minimised. This idea comprises a stand-alone box that can be retro-fitted, which measures the crank angles of the two engines as well as the TDC signals and speed setpoints. The phase angle is estimated dynamically and a new speed setpoint is imposed on one or both engines in order to achieve a target phase angle.*

The described purposes and methods have been applied by Sulzer <1971. JP4748932 explicitly mentioned the application on a twin 7-cylinder engine. In 1982 Sulzer applied SPS on the cruise vessel MV TROPICALE built at Aalborg Shipyard in 1982 and equipped with 2x 7RND68M. The electr. black box was delivered by Phillips.

What might be new is the claim that the control systems are able to control more than one optimum phasing of the two engines.

As far as I remember, our system can have different phasings at different speeds to compensate more than one type of vibration.

In addition we should include a closed-loop control which enables the system to automatically find the optimum phase shift at any speed to compensate/reduce any kind of vibration in the operating speed range.