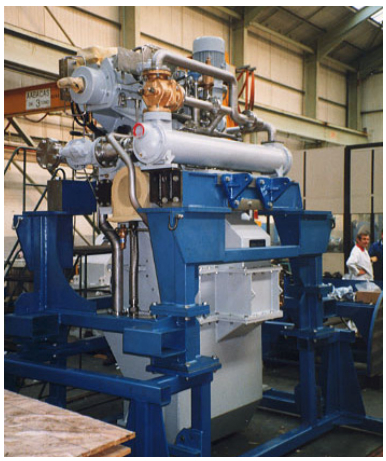
Naval Propulsion Systems

Somewhere in Scandinavian waters there is a very fast and manoeuvrable "stealth" patrol boat powered by two 1 mega watt gas turbine water jet propulsion units.

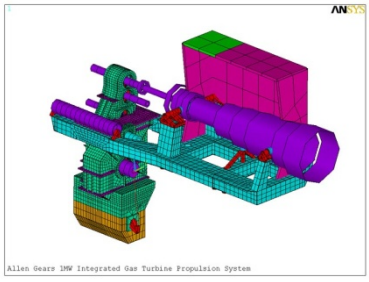
The power from the very high revving turbines is delivered to the water jet impellors through gearboxes manufactured by Allen Gears.

Bennett Associates was engaged by Allen Gears to analyse the gearbox casings, from the analysis determine the misalignments within the gearbox and to design aluminium frame structures that fit within the fibreglass hull to support the gearbox, gas turbine and all the ancillary acoustic shrouding. The gas turbines are mounted directly on to gearboxes and the complete unit mounted on springs.



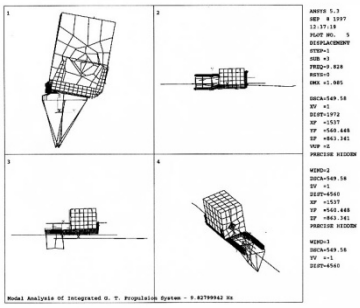
Part of Bennett Associates' contract was to verify that the design met DNV regulations, which covered the shock impulse load criteria. When the 6g as defined by DNV regulations was applied it actually generated a 12g impulse to the equipment on the frame.

The initial work carried out by Bennett Associates to resolve the acceleration issues also predicted problems with the way that it was proposed to mount the turbines. The interface between the gas turbine running at very high RPM and the gearbox is particularly complicated. Care had to be taken not to inflict extraneous loads on to the turbine.



Bennett Associates went on to liaise with all the parties to resolve the turbine mounting problems, validate that the whole of the propulsion package met the DNV criteria and to ensure that the units fit the tight confines of the vessel.

The design was finalised using detailed FE models. The vessel has been in service for a number of years and to date there have been no reported problems with the propulsion units.



Bennett Associates (originally founded in 1984) was acquired in 2008 by Atkins; bringing their proven technical expertise to the UK's leading engineering consultancy.

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