

## Design of Gas Turbine Casting

Bennett Associates was commissioned to carry out the Finite Element Analysis and the design optimisation of a compressor discharge case and turbine shell for two of the largest gas turbine units in the world.

Up to this time the turbine shell and discharge casings had been fabrications. It was now intended to produce these very complicated structures as castings.

The ultimate client, a world leader in the supply and manufacture of gas turbine power units, laid down strict parameters for ensuring the final design would satisfy their requirements with regard to "safety, maintainability and inspectability" as defined in the appropriate ASME Design Regulations.

Finite Element computer models were produced with fine enough mesh to accurately predict mechanical and thermal behaviour of the compressor discharge casing and turbine shell under a variety of loadcases.

The loadcases included simulations of normal start up and steady state operating conditions. Path ovality was checked at steady state and at worst state transient conditions.

The design of the 4 way joint between the two main casings was particularly critical. A compliant bolting method had to be designed to ensure the metal to metal joints remained 'gas tight' under all conditions.

Bennett Associates produced the detailed manufacturing, casting and machining drawings requiring many cross sections through the very complex castings.

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

