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## HYDROPOWER ENGINEERING SERVICES

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MB Century has extensive experience in providing investigation, design and commissioning services to the Hydropower industry.

We pride ourselves on our efficient, effective and accurate maintenance procedures, which are certified to ISO 9001.

### Engineering Services

MB Century has a highly competent team of qualified mechanical, process and civil engineers and draughtsmen to resolve problems encountered within hydropower generation. Services include:

- > Specification writing and review for all aspects of machine maintenance, replacement and testing
- > Commissioning plan writing and review
- > Design engineering following concept through to detailed design
- > Draughting of all new designs and modification to existing drawings
- > CPEng accredited engineers for design and review of design solutions. Review and recommendation service available for third party designs
- > Feasibility studies and detailed recommendation/design reports
- > Engineering support for major turbine-generator overhauls and upgrades
- > Workshop QA on components under refurbishment or manufacture
- > Site presence for major overhauls and QA on installations
- > Production, review and compilation of Inspection and Test Records for major and minor projects
- > Auxiliary system design solutions including screen cleaners and pumps
- > Alignment procedures and reporting for both large and small pieces of rotating

equipment

- > Inspection of all major hydro machinery components including, bearings, generators, turbines, penstocks and gates

### Project Management Services

MB Century offer the complete project management service to ensure projects run to schedule and budget. With a proven track-record, services include:

- > HSE – We seek to maintain the highest levels of quality while providing a safe and healthy workplace that protects employees, clients, suppliers, communities and the environment
- > Scheduling advice and risk assessment

for major projects

- > Early cost advice, financial management and contractual control of construction projects
- > Subcontractor management and QA with an emphasis on clear lines of communication back to the client
- > Management of Inspection and Test plans in line with client requirements

## Procurement & Supply Services

MB Century has affiliations with major OEMs who can offer complete replacement packages for:

- > Turbine runners and all associated equipment
- > Governor systems including servomotors and wicket gates
- > Generator rotors, stators and related equipment
- > Associated design services

## Mechanical Services

To complement the engineering and project management service, MB Century has a dedicated team of experienced tradesmen to carry out maintenance including:

- > Full inspection and overhaul of hydro turbine-generator units
- > Modification and upgrade of hydro turbine-generator units
- > Modification and refurbishment of sluice gates, head gates and auxiliary equipment

- > Fabrication of replacement and new pipework within hydropower stations
- > On and off site sandblasting and painting services
- > Alignment of both major and minor rotating equipment
- > Access to NDT services

## Hydro Experience

MB Century and its staff have over 30 years' experience in hydropower maintenance solutions. Experience includes:

### Major Overhauls

- > In excess of 40 major overhauls in the North Island (NZ) e.g. Aratiatia, Whakamaru, Maraetai, Tokaanu, Piripaua and Rangipo
- > Procedures/methodologies and plans for the disassembly of turbine-generator units
- > Design of critical mechanical components such as greaseless bushing systems for wicket gates and linkages
- > Commissioning activities including on site and planning support for load rejection and over-speed testing
- > Orifice plate design to reduce wicket gate closing rate during trip conditions
- > Erosion protection for turbine components using Urethanes and other trial materials
- > Design of kidney loop filtration systems for bearings, governors and head gates
- > Machine alignment correction recommendations based on 'as-found'

data. Working to both CEA and IEEE alignment standards

- > Welding procedures for repairs to worn or fatigued components
- > Alternative repair design solutions such as metal spray shafts and metal stitch on bottom ring

### Turbine-Generator Upgrades

- > Installations of new turbine runners at Ohakuri, Tokaanu, Piripaua (stator upgrade also) & Aviemore
- > Design of air admission systems to enhance load rejection capabilities
- > Noise reducing enclosures to minimise harmful operating noise
- > First article inspection on turbines and components
- > Wicket gate leakage efficiency enhancement

### Other

- > Screen cleaner tine enhancement to maximise grab efficiency
- > Removal of redundant excitation equipment and shortening of the associated shaft

