

# DAN CAMPBELL, P.ENG.

Manager Hydro Projects, Principal

dcampbell@klohn.com

## EDUCATION

Fundamentals of Professional Practice, ASFE (2007)

Design Build Seminar (2001), Personnel Management (1995), Preventative Maintenance & Vibration Monitoring (1988)

Post Graduate courses in Naval Architecture  
University of British Columbia

B.A.Sc. in Mechanical Engineering  
University of British Columbia, 1979

## PROFESSIONAL REGISTRATIONS

Association of Professional Engineers & Geoscientists  
of British Columbia

Association of Professional Engineers, Geologists, and  
Geophysicists of Alberta

Engineers Yukon

## PROFESSIONAL AFFILIATIONS

Canadian Bridge Code Committee Member - CSA S6  
Section 13 Moveable Spans

## PROFESSIONAL HISTORY

*Klohn Crippen Berger Ltd.*  
Manager, Hydro Projects, 2005-Present  
Manager, Special Projects, 2005-Present

*Klohn Crippen Consultants Ltd.*  
Manager, Special Projects, 1996-2005  
Manager, Transportation, 1999-2002  
Manager, Hydroelectric, 1996-1999  
Manager/Resident Engineer, Thailand, 1994-1996  
Manager, M&E Department, 1993-1994

*Crippen Consultants*  
Project Manager, 1988-1993

*Acres International, Ontario*  
Manager/Mechanical Engineer, 1986-1988

*Crippen Consultants*  
Mechanical Engineer, 1981-1986

*Canadian Cellulose Company*  
Maintenance Engineer, 1979-1981

Dan has more than 36 years of varied experience relating to hydroelectric projects, movable bridges, ports, and drydock projects. He has project planning, design, construction supervision, site inspection, asset evaluation, contract negotiation, and general project management experience. Dan has worked on hydro projects across Canada, and internationally in the United States, Argentina, Columbia, Brazil, Peru, Vietnam, Thailand, Sri Lanka, and India.

## HIGHLIGHTS OF EXPERIENCE

- Project layout, design of balance of plant, equipment selection and project management for hydroelectric projects;
- Asset evaluation/condition assessment for lenders and potential purchasers; and
- Domestic and international experience.

## KEY PROJECT EXPERIENCE

### Laos Due Diligence

*Democratic People's Republic of Laos*

Project Director and mechanical engineer for the onsite asset assessment and technical due diligence for three hydro project, 60 MW, 40 MW and 7 MW in the highlands of Laos. The report to the potential buyer outlined the expected energy generation, suggesting operational improvements and potential capital enhancements

### Site C Hydromechanical

*British Columbia*

Senior Review for the bid design of the large spillway radial gates, servomotor operated intake and maintenance gates and the draft tube gates.

### Elko Hydro Redevelopment

*British Columbia*

Senior Reviewer for the prefeasibility and feasibility level studies to determine the best way to redevelop the existing site. Selected solution included reuse of the existing intake, tunnel and surge shaft and new dam, penstocks and powerhouse increasing the project capacity from 12 MW to 20.9MW.

### Amisk Hydro Project

*Alberta*

Senior Reviewer for the feasibility study work to construct a xx mw hydro project on the Peace River. Developed the concept of using 6 bulb turbines in a

single powerhouse instead of the original 24 unit configuration split between two powerhouses.

## **Water Retaining and Control Structures**

### *British Columbia*

Relationship manager and senior reviewer for a multiyear program of dam safety related work for BC Hydro. Projects involved with include:

- John Hart spillway gates replacement;
- Strathcona Low level outlet tunnel;
- Puntlege intake and bypass upgrades;
- Wahleach penstock seismic assessment;
- Bridge River 2 penstock seismic assessment;
- Mica spillway deficiency investigation; and
- La Joie north conduit deficiency investigation.

## **Hydro Projects**

### **Ituango Model Test**

#### *Colombia*

Independent witness on behalf of the owner for model testing of the 8 Francis units for the 2400 MW Ituango Project. Each turbine has ring gate for unit shut off.

### **Temiskaming Dam**

#### *Ontario*

Project reviewer for a study to evaluate the feasibility of adding hydro generation to the new dam being designed. This is a low head structure, less than 2 m; equipment selection and space requirements were two of the issues. Work included technical evaluation of suitability of VLH turbines for the site, and impacts on dam costs.

### **Northern Hydro (Woodcock Falls)**

#### *Saskatchewan*

Senior project reviewer for the site selection of a proposed new hydro project. Work included initial site inspections, basic project configurations, energy and cost calculation leading to selection of the preferred site.

### **Marsh Lake Gate Replacement**

#### *Yukon*

Project Senior reviewer for the design of new steel gates. Gate design was suitable for dedicated hoist or travelling gantry crane operation.

### **John Hart PPP**

#### *Campbell River, British Columbia*

Project senior reviewer, powerhouse designer, and lead mechanical designer for the bid engineering effort on behalf of one of the PPP proponent teams. Coordination with Voith design and geographic constraints to layout a compact powerhouse with lowest hydraulic losses and simplest construction. Worked with PPP proponent to identify project risks, mitigation options and also cost saving opportunities which met the technical requirements.

### **Temiskaming Dam**

#### *Ontario*

Project manager for a study to evaluate the best location to construct a replacement dam. Both technical issues related to the dam construction and the impact on local residents during and after construction were considered as part of the evaluation criteria. Risk review and analysis was part of the assignment to determine the optimum replacement dam location.

### **Pervari Hydro Project**

#### *Turkey*

Mechanical review of the conceptual design to date looking for fatal flaws and areas of concern as part of a due diligence assignment for the Owner.

### **John Hart Redevelopment Concept (BCH)**

#### *Campbell River, British Columbia*

Mechanical Senior reviewer for the intake design including the penetration through the concrete dam and temporary bulkhead, the bypass valves tunnel and penstock layouts. Equipment included trashrakes, gates, isolation and energy dissipation valves, and associated power supplies.

### **Confidential Client**

#### *Alberta*

Project manager for the review and site selection of a proposed new hydro project. Work included initial site inspections, basic project configurations, energy and cost calculation leading to selection of the preferred site.

### **Cascade Valve Seal Redesign**

#### *Alberta*

Project manager for the redesign of metal to metal seals on two large butterfly valves. The new seals incorporate a rubber element and improve sealing.

The work also included the SDI certification of the valves.

### **Kananaskis Unit 3 Gate Upgrade**

*Alberta*

Project manager for the design of two replacement draft tube gates and the refurbishment of an intake gate. The work also included the SDI certification of the gates.

### **Bears paw Gate Replacement**

*Alberta*

Project manager for the design of two replacement intake gates. For access reasons the gates needed to be fabricated in sections, transported under the existing hoists and then assembled *in situ*.

### **Kananaskis Unit 3 Gate Upgrade**

*Alberta*

Project manager for the design of two replacement draft tube gates and the refurbishment of an intake gate. The work also included the SDI certification of the gates.

### **Dunvegan Hydro Project**

*Alberta*

Mechanical lead for a unique in-river weir type hydro project with a submerged powerhouse. Design components included trashracks, trashrake, upstream and downstream stoplogs, fish passage gates, navigation locks, and submerged powerhouse layout.

### **Snoqualmie Redevelopment Project**

*Washington*

Project reviewer for some mechanical portions of the project including gates and specific issues such as the underground ventilation concept.

### **Spray Penstock Replacement**

*Canmore, Alberta*

Design leader for the replacement of a wood stave penstock with a steel penstock. Design elements included steep inclined supports, buried sections, and expansion joints on the 8 ft. diameter penstock.

### **Three Sisters Intake Gate**

*Alberta*

Senior reviewer for the design of a new intake gate and modifications to the existing hoist.

### **Strathcona Intake Seismic upgrade**

*British Columbia*

Senior reviewer for the detailed design for the new intake gate, stoplogs, and hoists. All equipment is designed to resist significant lateral movement and displacement.

### **TransAlta Equipment Single Device Certifications**

*Alberta*

Condition assessment, design review, and safety review for intake and draft tube gates and large inlet valves for a variety of older hydroelectric plants.

### **Porce III Hydro Project**

*Columbia*

Independent witness on behalf of the Owner for the turbine model testing. The 1 Billion dollar project will have four 172 MW units in an underground powerhouse downstream of a rockfill dam.

### **Nam Theun 2 Hydro Project**

*Laos*

Project reviewer for penstock access door, gate layouts, HPU's, and other mechanical systems and equipment.

### **Ashlu Hydro Project**

*Squamish, British Columbia*

Project Manager and Mechanical Engineer responsible for the preliminary design of a 45 MW run of river independent power project.

### **Zeballos Hydro Project**

*Zeballos, British Columbia*

Project Manager and Mechanical Engineer for the preliminary and detailed design of a 22 MW independent power project utilizing an existing landslide as a dam. Project includes a tunnel with a hot tap into the lake, a submerged intake tower, penstock, surge tower, and two separate powerhouses.

### **Irrican Hydro**

*Lethbridge, Alberta*

Project Manager and Designer for a 7 MW run of a canal power plant in southern Alberta.

### **Skins Lake Spillway**

*Burns Lake, British Columbia*

Mechanical lead for the design of modifications to install a diversion pipe with an underwater hydraulic gate on bottom stoplog. The discharge pipe passed under existing radial gates and around the exiting

spillway with a regulating gate at the end of the pipe. Using the pipe, fish flow was maintained during spillway rehabilitation.

### **West Kootenay Power Due Diligence**

*Canada*

Project Manager responsible for conducting a condition audit of four powerhouses on behalf of a potential purchaser. Duties included performing a review of upgrade and expansion plans, as well as an inspection of existing facilities and risk review. Total value of assets was estimated to exceed \$5 billion.

### **Yaupi Upgrade Study**

*Perú*

Project Manager for an audit and rehabilitation study for 5 x 20 Pelton units and 4 x 14 Francis units at two powerhouses in Peru. Study involved optimizing additional flow, equipment upgrades, telecommunication, control and market study.

### **Eletrosul Due Diligence**

*Brazil*

Mechanical/Electrical Lead as part of a potential buyer's technical review and audit evaluation of 4500 MW of hydroelectric assets being privatized.

### **Cachoeira Dourada Due Diligence**

*Brazil*

Technical Leader for a potential buyer's audit evaluation of 658 MW hydroelectric projects being privatized. Led team in an on-site inspection and condition assessment of powerhouse and radial gate spillways.

### **Bhumibol Unit 8 Hydroelectric Project**

*Thailand*

Project Manager/Resident Engineer responsible for project management, design review, construction auditing, and commissioning of a \$100 M dollar 175 MW pump-turbine. Major equipment included the pump-turbine and motor-generator, powerhouse cranes, auxiliary systems, control systems, transformer, and 10 radial gates at the new After bay Dam.

### **Whitehorse Falls Dam Safety**

*Whitehorse, Yukon*

Conducted an electro/mechanical dam safety audit of a multi-unit installation. Equipment included spillway, gates and hoists, and powerhouse equipment.

### **Keenleyside Hydro Project**

*Castlegar, British Columbia*

Reviewed mechanical turnkey specifications for gates and powerhouse services associated with two 85 MW Kaplan units.

### **Mamquam Power Project**

*Squamish, British Columbia*

Prepared mechanical/electrical portions for a 50 MW underground powerhouse turnkey bid.

### **Kemano Completion Project**

*Kemano, British Columbia*

Provided detailed design, specification preparation and bid review of the station services on the 540 MW Project. Duties included detailed design, seismic design, specifications, and bid review of the fire protection, HVAC and cooling water systems, review of standby diesel generator, design and selection of fire and cooling water supply pumps, review of the draft tube gate and hoist designs, and assisted in review of turbine and generator contract submissions.

### **Lobstick Control Structure**

*Churchill Falls, Labrador*

Resident Engineer responsible for the implementation of the first dewatering inspection of the Lobstick Control structure. Duties included construction supervision of 85 t bridge relocation, installation supervision of temporary stoplog gantry, hoist and stoplogs, spillway bay concrete inspection and repair supervision and commissioning.

### **West Salmon Spillway**

*Newfoundland*

Designer and Resident Engineer responsible for the expansion of a spillway. Work included the supervision of all mechanical, civil, and electrical design of the two vertical gates and wire rope hoists, construction and commissioning.

### **Chimera Hydro Project**

*India*

Design Engineer responsible for detailed design, specifications, and bid review of the HVAC, fire protection, cooling water, drainage and un-watering systems for a \$600 M underground powerhouse in India. Also conducted a design audit of the draft tube, surge shaft, intake and bulkhead gates, and intake trash racks and rake machine for the project.

## **Paradise River**

*Canada*

Project Engineer responsible for all civil and mechanical design, drafting supervision, and client liaison for an intake gate project. Duties included the detailed design of gate structure, gate hoist, and hoist structure.

## **Maduru Oya Irrigation Dam**

*Sri Lanka*

Resident Engineer (Mechanical/Electrical) responsible for all mechanical and electrical construction supervision on the \$100M Maduru Oya Reservoir Project. Duties included construction supervision of Chinese contractors' installation of vertical and radial gates, servomotors, hoists, trash racks, trash rake machines, mechanical and electrical commissioning of project, and preparation of maintenance manuals.

## **Nipawin Hydro Plant**

*Nipawin, Saskatchewan*

Assistant Resident Engineer (Mechanical) responsible for the site construction supervision of three 85 MW generators, powerhouse cranes, intake and spillway gates, and hoists and station services.

## **Glenmore Dam, City of Calgary**

*Calgary, Alberta*

Provided senior review of the low level outlet butterfly rehabilitation project. Also provided design review for two slide gates serving Low Level Outlets. From the results of the design review, the skinplates were stiffened before they were put into SDI service.