John A. Mackintosh

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KEY QUALIFICATIONS

John Mackintosh has nearly 50 years experience in construction of heavy civil engineering projects worldwide and has held a variety of roles including project manager, construction manager, resident engineer, chief engineer, project controls manager, scheduling specialist, claims specialist and cost control specialist. He has extensive experience in underground construction, dams and river works predominantly in hydroelectric construction. He also has extensive experience in project scheduling and forensic time impact analyses to support claims for extensions of time with an intimate knowledge of Primavera P6 scheduling software. He is computer literate, familiar with, and experienced in the use of a wide variety of proprietary software.

EXPERIENCE

LDR CONSTRUCTION CONSULTANTS (May 2014 to Present)

Since May 2014 acting as a private consultant specializing in time impact analyses on construction claims has been involved in the following projects:

South Africa – Mount Edgecombe Interchange

Botswana – Okavango Bridge Project

Kenya – Kimwarer Multipurpose Dam Project

Kenya – Arror Multipurpose Dam Project

Kenya – Itare Dam

Denmark – Storstrom Bridge Project

Oman – Batinah 5 Expressway

Oman – Frontier Camps

Abu Dhabi – Reem Mall

Abu Dhabi – Zayed Road Project

Qatar – Red Line Metro

Qatar – New Orbital Expressway

Laos – Nam Theun 1 Hydroelectric Project

Dubai – Dubai Metro

Nepal – Melamchi Water Supply Project

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Norway – Follo Project

Lebanon – Greater Beirut Water Supply Project

Singapore Metro – Singapore

Client: CMC di Ravenna
Employer: LDR Construction Consultants
As a private consultant specializing in time impact analyses, produced various time impact analyses to support claims for extensions of time on the construction contract of the Client using Primavera P6 software. Apart from one week spent at the Client's offices in Singapore gathering background data, work for the remaining time was carried out remotely over the specified period on an as required basis. (Feb - May 2014).

Ingula Pumped Storage Scheme – South Africa

Client: Eskom
Employer: CMI (Joint venture of CMC di Ravenna, P G Mavundla and Impregilo SpA).
As a private consultant specializing in time impact analyses, produced various time impact analyses to support claims for extensions of time on the construction contract of the Employer using Primavera P6 software. For the entire specified period work was performed on site in South Africa. (Feb – May 2014).

Ingula Pumped Storage Scheme – South Africa

Client: Eskom
Employer: Impregilo SpA
As Chief Engineer for the contractor CMI for the civil works (a joint venture of CMC di Ravenna, P G Mavundla and Impregilo SpA), was responsible for all technical aspects of design, planning, geology, survey and laboratory testing of materials. Was also responsible for overall programme coordination with other contractors and the development of time impact analyses associated with compensation events. As department head of the technical office, was responsible for production of shop drawings, bar bending schedules, production of method statements, maintenance and revision of the construction programme using Primavera P6 software, and production of monthly progress reports.

The Ingula Pumped Storage Project has a capacity of 1332 MW and an energy storage capacity of 21,000 MWh. The scheme involves an upper reservoir in the Free State Province, an underground power tunnel complex and power station, and a lower reservoir in KwaZulu-Natal Province. The distance between the upper and lower reservoirs is about 6 km and the elevation difference is approximately 470m. (2011 – 2013)

Third Set of Locks Project – Panama Canal

Client: Panama Canal Authority(ACP)
Employer: Impregilo

As Technical Coordination Manager for the Contractor's consortium GUPC comprised of Sacyr, Impregilo, Jan De Nul and CUSA, was responsible for managing the technical interfaces between the Contractor GUPC, the Contractor's Designer CICP and the Employer ACP. Coordinated the permanent works design development by CICP with the construction requirements of GUPC. Reviewed and

approved CICP submittals and followed up on quality and adequacy of design documents. Ensured Field Change and Clarification Requests were resolved. Managed a team of civil, electrical and mechanical design coordinators. This team interfaced between design and procurement by producing requests for proposals for issue to vendors, responding to requests for information, and generally coordinating the technical aspects of the design with the procurement of equipment and materials. (2010 to 2011).

Nadarivatu Renewable Energy Project
Client: Fiji Electricity Authority
Employer: MWH New Zealand Ltd.
As Construction Manager for the entire project responsible for all aspects of construction management including constructability reviews, coordination of the work of the EPC contractor, inspection and quality assurance, environmental protection and monitoring, monitoring the performance and progress of the contractor without supervising or directing such work, certification of progress payments, claims avoidance and resolution, change order negotiation and preparation, and approval of completed work. The Nadarivatu Renewable Energy Project is a hydroelectric project comprising a 46m high mass concrete diversion weir incorporating a double undersluice with slide gates and a three bay radial gated spillway; an intake structure, a 2 km long tunnel 3m diameter, a 2m diameter penstock, a surface powerhouse housing two 22 MW Pelton turbine-generators, a 7 km long 132 KV transmission line and a 132 KV switchyard. (2009 – 2010)

Karahnjukar Hydroelectric Project
Client: Landsvirkjun
Employer: MWH Americas Inc.
In cooperation with the Owner's Representative was tasked to observe, monitor, record and influence improvement and quality of the Contractor's progression of the remaining Work, in particular the finishing works in the Headrace Tunnel and the remaining Jokulsa Diversion Tunnel drive in reference to the detailed Schedule of Work and the Technical Specifications. Was also tasked with taking a lead role in supporting, advising, guiding and assisting the Owner's Representative staff and giving management direction. Took a lead role in settlement of disputes and the valuation of variation orders required to be settled for the Final Certificate. (2007 – 2008)

Al-Wehdah RCC Dam and Multipurpose Project
Client: Jordan Valley Authority (JVA)
Employer: MWH Americas Inc.
As Impounding Engineer prepared the reservoir filling manual. The $87 million construction contract includes a 90-m-high, roller compacted concrete (RCC) dam with integrated outlet works for irrigation and domestic needs along with provisions for future hydropower facilities. (2006 – 2007)

Weehawken Tunnel/Bergenline Ave Station, North Bergen, NJ, U.S.A.
Client: New Jersey Transit (NJT)
Employer: Washington Group International
As Construction Manager for the Design-Build contractor was responsible for all aspects of the subcontract including construction management, coordination of the work of the subcontractor, inspection and quality assurance, environmental protection and monitoring, monitoring the performance and progress of the subcontractor, certification of progress payments, claims avoidance and resolution, change order negotiation and preparation, schedule analysis and approval of completed work. The Weehawken Tunnel/Bergenline Avenue Station subcontract was a part of the

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overall development of the Hudson-Bergen Light Rail Transit system in Weehawken, Union City and North Bergen, New Jersey for New Jersey Transit. The subcontract covered the rehabilitation of an existing rail tunnel 30' x 22' high and 4100' long through the palisades diabase sill formation and the construction of an underground station 850' long and 60' wide with a 37' diameter 155' deep high-speed elevator shaft to a surface plaza area on Bergenline Avenue. (2002 – 2006)

Kali Gandaki "A" Hydroelectric Project, Nepal
Client: Nepal Electricity Authority (NEA)
Employer: Washington Group International
As Construction Manager for the entire project responsible for all aspects of construction management including constructability reviews, coordination of the work of different contractors, inspection and quality assurance, environmental protection and monitoring, monitoring the performance and progress of the contractors without supervising or directing such work, certification of progress payments, claims avoidance and resolution, change order negotiation and preparation, and approval of completed work. Also acted as Project Manager during extended periods when the Project Manager was absent from work for medical treatment. The Kali Gandaki "A" Hydroelectric project has a capital cost of around $450 million and is located in the Syangja district of Nepal some 250 km west of the capital Kathmandu by road. The project features a concrete gravity dam 45 m high with 3 gated spillways, an 6 gated intake structure with sluicing facilities, a desanding basin with sluicing channels, flushing gates and collector channel, a power conduit 160 m long to headrace tunnel portal, a concrete lined 7.4 m finished diameter headrace tunnel 5,900 m long with access adits at upstream and downstream ends, a reinforced concrete lined surge tank 26 m diameter and 50 m high, a steel lined pressure shaft and penstock 6 m diameter and 230 m long, a three branch steel manifold, and a three-unit surface powerhouse (144 MW installed capacity) 100 m long by 24 m wide by 35 m high. (1997 – 2001).

Karun III Hydroelectric Project, Iran
Client: Khuzestan Electricity Corporation
Employer: Acres International Ltd.
As Construction Area Manager for all underground works responsible for project management/administration duties, which included supervision and monitoring of the work carried out by the contractor on all underground construction work. This included the 2000 MW powerhouse cavern, transformer cavern, surge shafts, bus shafts, pressure shafts, intake gate shafts, upper and lower power tunnels and penstock tunnels, draft tube tunnels and tailrace tunnels. Other duties included being responsible for design, contractual, administrative and technical matters related to the construction of the underground works. Also developed an accelerated construction schedule using Primavera software for the construction of the 205 m high arch dam. The Karun III Hydroelectric Project had a capital cost in excess of $1.5 billion and is located in Khuzestan Province in the Islamic Republic of Iran. The project features a 205 m high double curvature concrete arch dam with a crest length of 380 m, a three bay gated spillway with flip bucket chutes, a 2000 MW underground powerhouse complex comprising eight 250 MW turbine generators, two fully concrete lined intake tunnels 12.6 m diameter, two upper power tunnel bifurcations, four fully concrete lined upper power tunnels 9 m diameter, 150-m-long intake gate gallery cavern, four elliptical gate shafts, four 9 m diameter power shafts, four lower power tunnels 9 m diameter, four penstock bifurcations, eight penstock tunnels 5.5 m diameter, a powerhouse cavern 29 m wide, 47 m high and 250 m long, 230 m long transformer gallery, eight surge shafts, eight bus shafts, eight draft tube tunnels feeding twin tailrace tunnels 15 m diameter via two 4 branch manifolds and fully concrete lined. (a 9 month assignment). (1996 – 1997)

Lesotho Highlands Water Project, Lesotho
Client: Lesotho Highlands Development Authority (LHDA)
Employer: Acres International Ltd.
Initially assigned as Assistant Construction Manager and later as Chief Engineer -Tunnels for the Lesotho Highlands Development Authority, was responsible for Project Management/Administration duties which included the supervision and monitoring of the work carried out by consultants under FIDIC IV conditions in respect of design, contractual, administrative and construction matters related to the construction of the 185 m high concrete arch dam and 60 km of 5m diameter tunnels. Other duties involved estimation, preparation of contract documents and bid evaluation review. During this period he also developed many applications on an Oracle database for use by the construction division to assist with the work of the consultants. The Lesotho Highlands Water Project was constructed to allow the transfer of water to the industrial area of the Republic of South Africa in the north from the Senqu River, which flows south through Lesotho. Phase 1A involved the construction of 80 km of 5 m diameter tunnels; the Katse Dam - a 185 m high double curvature concrete arch dam with a crest length of 720 m; a 72 MW underground powerhouse complex; and an ancillary concrete dam and intake structures. Construction of the tunnels was carried out by five tunnel boring machines (TBM's) through basalt and sandstone formations. There were eight major construction contracts and three major consultancy contracts with a capital cost in excess of $1.4 billion. In addition to the excavation of the tunnels by TBM, there was a considerable amount of open cut excavation and adit construction by drill and blast techniques. (63 months) (1991 – 1996)

Karun III Hydroelectric Project, Iran
Client: Khuzestan Electricity Corporation
Employer: Acres International Ltd
As Project Control Manager responsible for the initial stages of the design and implementation of a computer-based project control system that included project estimating, cost and budget control, schedule control, document control, man-hour control, procurement control, material control and financial forecasting. The Karun III Hydroelectric Project has a capital cost in excess of $1.5 billion and is located in Khuzestan Province in the Islamic Republic of Iran. The project features a 205-m-high double curvature concrete arch dam with a crest length of 380 m, a three bay gated spillway with flip bucket chutes, a 2000 MW underground powerhouse complex comprising eight 250 MW turbine generators, two fully concrete lined intake tunnels 12.6 m diameter, two upper power tunnel bifurcations, four fully concrete lined upper power tunnels 9 m diameter, 150-m-long intake gate gallery cavern, four elliptical gate shafts, four 9 m diameter power shafts, four lower power tunnels 9 m diameter, four penstock bifurcations, eight penstock tunnels 5.5 m diameter, a powerhouse cavern 29-m-wide, 47-m-high and 250-m-long, 230-m-long transformer gallery, eight surge shafts, eight bus shafts, eight draft tube tunnels feeding twin tailrace tunnels 15 m diameter via two 4 branch manifolds and fully concrete lined. (12 months) (1990 – 1990)

Niagara River Development Project, Ontario, Canada
Client: Ontario Hydro
Employer: Acres International Ltd
Staff Engineer responsible for investigating the constructability of twin tunnels, each 10 km long and 13.4 m in diameter, utilizing full-face tunnel boring machines. This involved the technical review of rock support design and the production of cost estimates for the tunnel construction. (1989 – 1989)

Underground Research Laboratory, Manitoba, Canada
Client: Atomic Energy Canada

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Employer: Golder Associates
As Construction Manager was responsible for the contract administration of the shaft re-deepening contract. The Underground Research Laboratory was an internationally sponsored project to test the feasibility of safely storing used nuclear waste underground.(1987-1988)

Becancour Magnesium Plant, Quebec, Canada
Client: Norsk Hydro
Employer: Monenco
As Project Controls Manager based in the Montreal office was responsible for cost control, scheduling and reporting on the design and procurement phase of this project. (1987)

Chamera Hydroelectric Project, India
Client: National Hydroelectric Power Corporation (NHPC), India
Employer: Acres International Ltd.
As Area Manager was responsible for the construction management of the tunnels, shafts and the underground powerhouse complex. Advised Indian contractors on the latest technology related to rock mechanics and construction methods and equipment on a day-to-day basis. Acquired experience with drilling rounds and installing rock support in difficult rock conditions using Tamrock electric-hydraulic jumbos. The 540 MW Chamera Hydroelectric Project is located in Himachal Pradesh State, India and the client was the National Hydroelectric Power Corporation. The project comprised the construction of a concrete gravity dam, a single headrace tunnel 8.5 m diameter through extremely difficult ground conditions, an upstream surge shaft, penstock manifold and three penstock tunnels, a powerhouse cavern, transformer gallery, draft tube tunnels, tailrace manifold and single tailrace tunnel. The underground excavation was accomplished by using the drill and blast method, and the design involved the use of the New Austrian Tunneling Method (NATM). The rock conditions were extremely variable and the rock support was installed on a design-as-you-go basis. (27 months) (1984 – 1986)

Cat Arm Hydroelectric Project, Newfoundland, Canada
Client: Newfoundland and Labrador Hydro
Employer: Monenco
As Resident Engineer (Tunnels), he was responsible for the construction management of the tunnels contract and the administration of project services for all contracts. The tunnel design was based on the NATM method and he was also responsible for specifying the rock support after every round in conjunction with the resident geotechnical engineer. The 127 MW Cat Arm Hydroelectric Project is located on the northern peninsula of Newfoundland, Canada and the client was Newfoundland and Labrador Hydro. The project comprised the construction of two impervious core rock fill dams, over 5 km of 5.6 m diameter tunnels and a surface powerhouse. The grades on the tunnels varied up to 20% and were excavated utilizing rubber tired equipment. (24 months) (1982 – 1984)

Jebba Hydroelectric Development Project, Nigeria
Client: National Electricity Power Authority (NEPA)
Employer: Monenco
Initially assigned as Area Manager he was responsible, through a team of engineers and technicians, for the supervision of construction of the saddle dam, auxilliary dams and the emergency spillway. The construction involved a considerable amount of open cut excavation with all the necessary rock support. Subsequently assigned as Project Controls Manager, was responsible for all project control functions including estimating, scheduling, contract administration, claims assessment, cost control, procurement and progress reporting. The 560 MW Jebba Hydroelectric Development Project is located

in Kwara State on the Niger River in Nigeria, Africa. The client was the National Electric Power Authority. The project comprised the construction of an impervious core rock fill dam, concrete auxilliary dams, gated chute spillway, navigation canal, saddle dam and emergency spillway. (1980 – 1982)

Nkula Falls "B" Hydroelectric Project, Malawi, Africa
Client: Electricity Supply Corporation of Malawi (ESCOM)
Employer: WLPU Consultants (Knight Piesold)
As Resident Engineer was responsible for the supervision of construction of the above ground powerhouse, pressure tunnel, penstock manifold and access roads. All excavation was performed by drill and blast and required on-site rock support design. Other duties included estimating, scheduling, contract administration, claims assessment, cost control and progress reporting. The 100 MW Nkula Falls "B" Hydroelectric Project is located on the Shire River in Malawi, Africa. The project comprised the construction of an impervious core rock fill dam, concrete intake structure, gated spillway, emergency spillway, low pressure conduit, pressure tunnel, steel penstock manifold and surface powerhouse. (1977 – 1979)

Mindola Tailings Dam, Zambia, Africa
Client: Anglo American Corporation (AAC)
Employer: WLPU Consultants (Knight Piesold)
As Resident Engineer he was responsible for the construction supervision of the rockfill dam (3-km-long). Other duties included contract administration and client liaison. The Mindola Tailings Dam is located in the Copperbelt in the Northern Province of Zambia, Africa. The project comprised the construction of a 3-km-long rockfill dam designed to impound tailings from the copper production facilities. (1975 – 1977)

Lusiwasi Hydroelectric Project, Zambia, Africa
Client: Zambia Electricity Supply Corporation (ZESCO)
Employer: WLPU Consultants (Knight Piesold)
As Resident Engineer, he served as the representative during the final stages of the contract and was responsible for the construction management and contract administration including operational start-up and testing and preparing for the final report. Additionally, he responded to requests for clarification/information, reviewed change orders and the associated quantities and cost estimates. The 12 MW Lusiwasi Hydroelectric Project is located in the Northern Province of Zambia, Africa. The project comprised the construction of an earthfill control dam, control weir and intake, concrete lined canal, forebay structure, twin steel penstocks (520 m head) and surface powerhouse. (1975 – 1975)

EDUCATION

BS/BSc (First Class Honours) Civil Engineering/Soil Mechanics Heriot-Watt University, Edinburgh, Scotland, 1974

Professional Registration: Canada, Registered Professional Engineer; UK, Chartered Engineer; Licensed Surveyor, UK,

Short Courses/Certifications: Safety Trained Supervisor, USA