



Rob Brown is the principal of Paterson & Cooke's Canadian practice based in Sudbury, Ontario.

Rob has worked on paste backfill and surface tailings applications since 1997. He has extensive international experience with paste plants, delivery systems and underground backfill placement. Prior to joining P&C, Rob was the Vice President, Construction and Operations for Golder Paste Technology Ltd.

Rob is a Professional Mining Engineer. He has authored several operating manuals, quality control procedures and papers involving paste plant design, operation and the transport of paste tailings.

Qualifications

1994, BSc Mining Engineering
Laurentian University, Canada

Professional Status

Professional Engineer (Ontario)

Specialization

Site commissioning and troubleshooting of
mining backfill projects

Oil sands fine tailings process and
deposition projects

Mobile and contracted paste backfill
operations

Mining pre-feasibility and feasibility level
backfill studies

Project management and contract
administration

Operator training and plant manuals

Laboratory testing programme design
including flow loop, UCS and dewatering

Scope development and scheduling

Notable Projects

Vale Voisey's Bay Paste Fill Feasibility, NL, Canada

Project Manager on this extensive testing and design project that produced several flowsheets and plant layouts to cover total tailings and blended tails/aggregate.

DeBeers Snap Lake, NWT, Canada

Project Manager responsible for the start up and field testing of this paste operation. Pressure loss data and troubleshooting were conducted on site. Design modifications to upgrade the plant and improve performance were designed and recommended.

Syncrude Tailings (MFT) Pumping Feasibility, Fort McMurray, Canada

Project Director for this extensive tailings test program (laboratory and field trials) to investigate the applicability of processing and pumping Mildred Lake MFT as a paste for surface tailings disposal. Extra curricular work included publication and presentation of a paper co-authored with the client.

Goldcorp Red Lake Paste Fill Expansion, Red Lake, ON, Canada

Project Director on this trade off study that developed options for the mine to transfer paste from their existing paste plants to a new ore zone away from the mine. Options included underground pumping, trucking and surface pumping.

Aurizon Casa Berardi, Paste Transport Study, QC, Canada

Project Manager on this study that compared paste production and transport options for the mine to transfer paste from the mill area to the distant mining areas some 5km away. Alternatives included underground pumping, trucking and surface pumping.

MATSA Plant Commissioning, Spain

Senior Engineer conducting the on-site commissioning of the paste plant at the Aguas Tenidas mine in Spain. Responsible for ensuring design intent was maintained for the surface mechanical equipment and underground pipeline. Performed on-site design modifications and supervised start up of the paste backfill / tailings system.

Suncor Paste Tailings Feasibility, Fort McMurray, Alberta, Canada

Project Manager responsible for this cutting-edge test program and feasibility design that investigated the suitability of paste technology and its application to oil sands fine tailings disposal. Scope covered concept and flowsheet development, thickening, clarification and water treatment, capex & opex.

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Diavik Paste Plant Operation Contract, Lac de Gras, Canada

Senior Project Manager building the project team to support the technical guidance of the Crushing, Grinding & Paste Backfill system designed by PasteTec. Responsible for building a team to include the day to day operations, quality control, training and technical support to one of Golder's largest clients. This project is currently on hold.

Vale Inco Secondment, Sudbury, Ontario, Canada

Senior Project Engineer seconded for a 1-year period to manage scope development, scheduling and contract administration on several new mine pre-feasibility and feasibility projects. Trained in Primavera and Hummingbird DM software.

Porgera Backfill Feasibility, Papua New Guinea

Project Manager on this backfill feasibility study comparing cemented aggregate fill and paste fill. Project progressed into the Basic Engineering phase for a paste backfill plant and distribution system.

TSMV Remediation, Calgary, Alberta, Canada

Project Manager and Site Engineer on this multi-million dollar land development remediation project. Designed and implemented a mobile paste production system that transformed local materials into paste backfill for injection into abandoned underground workings. Designed the testing programs and mix designs to generate flowable backfill for remote injection underground. Authored and presented several papers on this challenging project.

Moab Tailings Relocation, USA

Project Manager on this feasibility study into the re-location of 17 million tons of uranium tailings by conveyor and rail line. Cost estimating, scheduling and site layout were the main deliverables.

Myra Falls Lynx Pit Crown Pillar Support, Campbell River, British Columbia, Canada

Project Manager for the contracted injection of paste backfill at this mine in Western Canada. Designed backfill recipes and process to manufacture backfill from local tailings and inject into underground workings. Assembled and supervised a team for the tailings backfill production and placement.

US Borax, USA

Heavily involved in the pre-feasibility study to investigate alternative disposal methods for boric acid waste stream. Part of the team to develop unique testing program to characterize the material and design around the properties.

Stillwater Mine, SMC, USA

Modelled the underground distribution system to verify delivery distances, expansion capability and troubleshooting. Project evolved into trucking versus pumping options, and design of a paste pump transfer station. Authored the study into expansion options for paste backfill delivery at this laterally expanding mine.

Big Gossan Mine, Freeport, Indonesia

Project Manager for the pre-feasibility study looking at paste backfill for this large mine. Project is currently progressing through the Detailed Engineering stage.

Goro Project, Inco Limited, New Caledonia

Member on the design team to design the surface piping system for deposition of paste tailings in a surface tailings impoundment. Provided flow modelling, design criteria and piping design.

Bulyanhulu Gold Project, Kahama Mining Corp. Ltd. (Barrick), Tanzania

Part of the commissioning team to successfully start up the paste plant and be the first to pour a true paste on surface. Remained on site over a six month term to provide further training services and on-going operational support to the crews. A key member of the testing team (flow loop) and design team (underground distribution) in the early stages of the project.

Olympias Project, TVX Hellas, Greece

Managed the basic/detailed engineering of a 90 ton per hour paste backfill plant in Greece. Conducted the site visit, prepared the testing program and was successfully advancing the design before the project was put on hold due to permitting issues.

Cayeli Mine, CBI, Turkey

Designed the underground distribution system, attended the site visit and designed the expansion to the underground system into new ore zones.



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Kidd Creek Mine, Falconbridge Limited, Timmins, Ontario, Canada

Managed and authored several studies on paste backfill applications for deep level mining; including extensive flow loop testing, unconfined compressive strength testing and comparison against the local rock fill methods.

Campbell Mine, Placer Dome, Red Lake, Ontario, Canada

Designed the underground distribution system for this paste tailings backfill system and went on to supervise the on-site commissioning and underground upgrades. Authored a slot raising study for this same mine.

Caraiba Mine, Mineracao Caraiba, Brazil

Designed the underground distribution system for this paste backfill plant and was involved in procurement.

Myra Falls Operation, Boliden, Campbell River, British Columbia

Managed and authored several projects looking into the application and associated cost of paste technology at this mine.

Conceptual/Preliminary Engineering

Neves Corvo, Ruttan Mine, Cluff Lake, Dome Mine, Casa Berardi and numerous other unique engineering studies.

Flow Loop Tests and Laboratory Studies

Gonzague Langlois, Bell Allard, Myra Falls, Bulyanhulu, Snap Lake, General Chemical, Olympias Project and numerous other flow loop / material property investigations.

Employment Prior to Joining Paterson and Cooke

2008 to 2009; **Golder Paste Technology Ltd.**, Mississauga, ON, Vice President, Construction & Operations, Associate Responsible for leading this business area including PasteTec's site work efforts in construction management, quality control and contracted operations. Accountable for the growth and performance of this critical link between Detailed Design and Commissioning. Project Director or Senior Project Manager on larger tailings projects, Site Engineer ensuring design intent is maintained from concept to operation.

2006 to 2008; **Golder Paste Technology Ltd.**, Sudbury, ON, Senior Project Manager Mining & Construction Group Leader, responsible for managing all Oil Sands projects, larger mining/tailings studies and coordinating Construction Management & Engineering efforts. Assigned as Job Sponsor or Project Director on larger projects and proposal submissions. Completed a 1-year secondment to Inco Ltd where the main responsibilities were managing scope development, scheduling and contract bidding for various mining-related projects.

2004-2006; **Golder Paste Technology Ltd.**, Sudbury, ON, Office Manager Operated the day-to-day business affairs, including financials, staffing and budgets. Responsible for larger bid submissions and proposals, and sharing the Senior Review role within the company. Remained on as Senior Project Manager on a large remediation and contracting project in Western Canada.

1997-2004; **Golder Paste Technology Ltd.**, Sudbury, ON, Senior Project Engineer Project Manager / Senior Project Engineer on international mining projects. Managed waste audit and land remediation/backfill contracts as well as mining feasibility projects. Performed 6-month plant commissioning and operator training assignment in Tanzania, Africa for a backfill/surface disposal paste system. Managed the detailed engineering of a paste project in Greece and the detailed design of underground distribution systems in Canada, New Caledonia, Turkey and Brazil.

1994-1997; **Peter Kiewit Sons Co. Ltd.**, Mississauga, ON, Project Engineer Responsible for on-site supervision of large civil projects involving the demolition, construction and commissioning of hydro-generation dams and channels, and highway and rail bridges. In charge of budgeting and cash flow, contract negotiations, material procurement and progress billing. Field work involved jackleg drilling, rock anchor installation, shotcreting and grouting operations.

1993-1994; **E.B. Eddy Forest Products Ltd.**, Espanola, ON, Quality Control Engineer Responsible for plant and control room layouts and curtain wall configurations. Designed and executed an underwater silt reclamation program using subcontracted divers. Largely responsible for specifying and purchasing cranes to facilitate material handling within the new generator building and coordinated surveying programs to monitor construction. Surveying, inspections, concrete quality control and material procurement were daily tasks.



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Publications

R Brown, I Ahmed (2011) "*Backfilling on a Budget; low capital paste backfill injection for small mines or brownfield site remediation*". Proc. from Minefill 2011, Cape Town South Africa.

AJS Spearing, R Brown, M Treinen, M Theisinger (2010) "*The use of waste materials in underground coal mines*". 2010 Transactions of the Society of Mining, Metallurgy, and Exploration. Vol 328, p409-419, 2010.

I Ahmed, R Brown, R Francoeur, J Anderson (2010) "*Paste Benefits and Applications from the Mining Industry to Land Reclamation*". International Solidification/Stabilization Technology Forum.

S Wilson, R Brown, F Carnero, S Castro (2010) "*Design Intent to Reality – commissioning of the Aguas Tenidas paste backfill plant in Spain*". Proc. from 13th International Seminar on Paste and Thickened Tailings, Paste 2010.

Ahmed, I., R. Brown, M. Labelle and R. Lahaie (2009) "*Paste Pumping and Deposition Field Trials and Concepts on Syncrude's Dewatered MFT (Centrifuge Cake)*", Proc. Tailings and Mine Waste 2009.

Crooks, J., R. Brown and M. Raine (2004) "*Paste Technology Overcomes Coal Mining Legacy*", Mining Environment Magazine, July.

Newman, P., R. Brown and D. Landriault (2000) "*Evident Trends in the Pipeline Transport of Paste Backfill*"

Landriault, D., R. Brown and D. Counter (1997) "*An Evaluation of Paste Backfill at Kidd Creek Mine, Timmins, Ontario*"