

Henrick (Rick) T. Scholten, P.Eng.

Principal Engineer

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PROFESSIONAL PROFILE

Rick Scholten is a senior forensic engineer with 21 years of consulting experience. His specialty is in heavy equipment, machinery, and structural failure analysis. He has led teams on complex multidisciplinary losses and commonly works side-by-side with heavy-duty mechanics, contractors, occupational health and safety investigators, fire investigators, appraisers, and adjusters. He has exposure to a variety of industrial settings including oilsands facilities, processing plants, open pit and underground mines, compressor stations, welding shops, manufacturing facilities, and residential construction.

His expertise includes:

- Heavy equipment component failures
- Personal injury investigations
- Industrial machinery failures
- Managing complex and multidisciplinary losses
- Finite element analysis of structural systems
- Non-destructive testing
- Welded steel design (Oilfield, heavy equipment, and structures)
- Structural restoration of light commercial and residential properties
- Crane and rigging
- Stability testing mobile equipment
- Heavy equipment repair and modifications
- Surveying

EDUCATION

B.Sc. Mechanical Engineering, University of Alberta, Edmonton, AB

2000

PROFESSIONAL AFFILIATIONS

Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS)

Engineers and Geoscientists BC (EGBC)

American Welding Society

Canadian Welding Association

American Institute of Steel Construction (AISC)

ASM International

Society of Automotive Engineers

REGISTRATIONS / CERTIFICATIONS

Level III Welding Inspector – Canadian Welding Bureau

Predictive Index Analyst – PI Worldwide

WORK HISTORY

2020 – Present: Principal Engineer and Office Manager, Oak Forensic Engineering Ltd., Edmonton, AB

Founded in 2020, Oak Forensic Engineering is a failure analysis and prevention engineering firm based in Calgary and Edmonton, Alberta, with services primarily involving mechanical, materials, and structural disciplines.

2011 – 2020: Forensic Engineer and Engineering Design Consultant, Anderson Associates Consulting Engineers Inc., Edmonton, AB

Forensic failure analysis of incidents and property losses involving machinery, heavy equipment, and structural components such as welded structural steel, wood framing, or concrete.

2002 – 2011: Consulting Engineer, Kova Engineering Ltd., Edmonton, AB

Structural inspection, repair, design, and modification of heavy equipment with an emphasis on lift equipment (cranes and rigging).

2001: Design Engineer, Schlumberger Canada Ltd., Edmonton, AB

Design and testing of downhole completion tools.

1997 – 2000: Surveyor / Crew chief, EXH Engineering Ltd., Red Deer, AB

Summer work terms – secondary highway construction surveying.

AREAS OF EXPERTISE

Industrial / Heavy Equipment Incidents

Cause and origin analysis of incidents involving personal injury or fatality as well as equipment evaluation for the purpose of remediation. Specific work performed typically includes some or all of the following:

- detailed examination and documentation of the incident scene to determine the configuration of the equipment pre-event and evaluate the extent of damage;
- review of incident reports, procedures, statements, and equipment manuals, as well as operating and maintenance records;
- analysis of all evidence to determine the causal and contributing factors of the incident;
- evaluation of damaged equipment components in order to determine the course of action (replacement or repair);
- determination of the scope of repair work and delineation of betterment included in the repairs;
- provision of repair or replacement procedures when necessary;
- monitoring of the repair contractor's cost and schedule including review of invoices; and
- compilation of an investigation report, including photographs, figures, and analysis details.

Sample Projects

- Investigated the cause of a “near-miss” Portal Crane collapse which resulted in a multi-million dollar equipment and downtime claim (on behalf of the equipment owner).
- Investigated the cause of an indoor Carbon Monoxide build-up, resulting in a worker fatality (on behalf of Occupational Health and Safety).
- Investigated the cause of a high-pressure hydrogen release that resulted in severe burns to the worker involved (on behalf of Occupational Health and Safety).
- Investigated the cause of a piece of mining equipment falling approximately 100 feet resulting in a worker fatality (on behalf of Manitoba Workplace Safety and Health).
- Investigation of a worker fatality during the disassembly of a tower crane for the Defense Council.
- Evaluated the damage potential of H2S exposure on a mobile crane for an insurance company.
- Evaluated the damage potential and prepared a remediation schedule for lime exposure to a mobile crane for a craning company.
- Investigated the cause of an inadvertent forklift movement resulting in a worker fatality (on behalf of Occupational Health and Safety).
- Evaluated several equipment rollovers.
- Evaluated mobile crane boom failures during lifting.

Property Loss

Evaluation and recommendations for remediation:

- vehicle impact to both residential and commercial buildings;
- structural damage to residential and commercial properties due to fire, flood, wind, lightning, heavy snow, and explosion, etc.;
- building envelope concerns;
- evaluation of damaged residential foundations, both concrete and preserved wood;
- transport accidents of mobile homes and oilsands facility modules;
- residential and commercial water losses;
- wet/dry sprinkler systems;
- hydronic heating systems;
- chilled water systems; and
- truck frame rail repairs/extensions.

Analysis of a variety of structural components, including but not limited to:

- foundation walls (concrete and CMU);
- shearwalls;
- steel and wood framed structures; and
- temporary bridges.

Design of Welded Structural Steel and Aluminum Components

Designed or worked with a team of designers conceptualizing, detailing, and testing the following equipment:

- mobile crane substructures, pedestals, and outrigger assemblies;
- self-erecting tower crane pedestal (use overtop roadways);
- shop jib cranes and monorail craneways;
- below the hook lifting devices (spreader bars, lifting beams, engine lift attachments, etc.);
- wireline units;
- fall protection davit arms and anchorages;
- snubbing unit davit arms for expedited egress;
- horizontal drilling - pull heads;
- seat and seat belt anchorages;
- tow bars and hitch mounts;
- portable handrail systems;
- equipment conversions (CAT loaders converted to Rough-Terrain Forklifts);
- modified sea-containers with integrated craning capability;
- oilfield skids;
- roll-over protective structures (ROPS); and
- custom racking systems.

Machine Design

Completion of custom machine designs to improve functionality, safety, and operability of existing equipment. Specific collaborative work performed typically includes some or all of the following:

- review and analysis of existing equipment (pros and cons);
- identifying user needs (specifications and requirements) and determining feasibility;
- performing Hazard and Operability (HAZOP) study;
- prototype design based on HAZOP study;
- prototype testing; and
- developing operation and maintenance manuals.

Sample Projects

- Pipeline line-up clamps.
- Rig mat assembly machine.
- Tabletop sandblasting lance.
- Lightweight cable car drive system for maintenance of high-voltage transmission lines.

Computer-Aided Drafting and Finite Element Analysis

Machine and equipment design utilizing computer-aided drafting (CAD) and finite element analysis (FEA) in order to complete fast, accurate, and reliable engineering simulations. Past experience includes Autodesk Inventor Professional, Autodesk Nastran, ALGOR, and ANSYS Workbench.

Stability Testing of Mobile Lift Equipment

- Truck-mounted telescoping boom cranes.
- Truck-mounted aerial lifts.
- Specialized applications for crane trucks and aerial lifts for on-rail and on-rail bridge use.
- Load chart development for the above.

EXPERT WITNESS TESTIMONY

Alberta Court of Queens Bench, *Heinrichs v Woo*, 2017, Docket No. 1303-17407 Qualified with respect to:

- water ingress to residential structures;
- decay of structural framing members; and
- mold infiltration.

CONTINUING EDUCATION / ADDITIONAL TRAINING

American Institute of Steel Construction, *Torsion of Open Shapes*, August 2023.

ASM International, *Practical Fractography*, October 2022.

ASM International, *Scanning Electron Microscopy*, October 2022.

Steel Image, *Introduction to Examining Fractures*, October 2022.

American Welding Society, *WPS, PQR, WQTR, and other Acronyms*, October 2022.

EPIC Training, *Design of Deep Foundations*, September 2022.

Systems Improvement Inc., *TapRoot Global Summit*, March 2020.

Systems Improvement Inc., *TapRoot Effective Interviewing & Evidence Collection Course*, March 2020.

Systems Improvement Inc., *TapRoot Effective Interviewing Webinar*, 2019.

Parkland County Fire Services, *Forensic and Technical Photography*, 2019.

University of Alberta School of Business, Masters of Business Administration Program, *Various program Courses*, 2016 to 2019.

Building Science Corporation, *Experts' Session: Walls that Work*, 2016.

Canadian Welding Bureau, *Special Program for Welding Inspectors - Level 3*, 2015.

MacEwan University, *Digital SLR I*, 2014.

Lorman Education Services, *Building Codes in Alberta Seminar*, 2014.

American Trainco, *Electrical Troubleshooting & Preventive Maintenance*, 2013.

Predictive Index Management, *Predictive Success Workshop*, 2013.
Systems Improvement Inc., *Equifactor Equipment Troubleshooting*, 2013.
Systems Improvement Inc., *TapRoot Incident Investigation & Root Cause Analysis*, 2013.
American Welding Society, *Trends in Nondestructive Examination Conference*, 2012.
American Welding Society, *The Why and How of Welding Procedure Specifications*, 2012.
American Welding Society, *Weldability and Filler Metals for Structural and Energy Applications*, 2012.
Canadian Welding Bureau, *Special Program for Welding Inspectors - Level 2*, 2010.
Simutech Group, *Finite Element Analysis: Performing Rigid Dynamic Analysis in ANSYS Workbench*, 2008.
Simutech Group, *Finite Element Analysis: ANSYS Design Modeler Demonstration*, 2008.
ROI Engineering, *ANSYS Finite Element Analysis EKM Seminar*, 2008.
IMAGINIT Technologies, *Autodesk Inventor Advanced Assembly Modelling*, 2007.
IMAGINIT Technologies, *Autodesk Inventor Advanced Part Modelling*, 2007.
Canadian Welding Bureau, *Special Program for Welding Inspectors - Level 1*, 2007.
ROI Engineering, *Introduction to Ansys Part I and II*, 2007.
ALGOR Finite Element Analysis, *What's New in Algor - Module 910*, 2007.
ALGOR Finite Element Analysis, *ALGOR Professional - Module 906*, 2006.
ALGOR Finite Element Analysis, *Mechanical Event Simulation - Module 938*, 2006.
IMAGINIT Technologies, *Autodesk Inventor Fundamentals*, 2006.

PRESENTATIONS

Oak Forensic Engineering Ltd., *Structural Steel Investigations – For OHS Investigators*, at the first annual Alberta Occupational Health and Safety Investigations Unit Symposium, September 2023.
Oak Forensic Engineering Ltd., *Structural Steel Investigations – AAC and ICBC Accredited Webinar for Insurance Professionals*, May 2023.
Alberta Acoustics & Noise Association, *Determining Relative Member Tension through Natural Resonance – Upper Bosworth Creek Bridge*, at the Spring Noise Conference, 2007.

REFERENCES

References available upon request.