THE EXPERTS
Robson Forensic

DALE J. CAGWIN, P.E.
Mechanical Engineer

PROFESSIONAL EXPERIENCE

1998 to present **Robson Forensic, Inc.**
Associate

Provide technical investigations, analysis, reports, and testimony for failure analysis, and towards the resolution of commercial and personal injury litigation involving all aspects of mechanical, fire protection and product engineering including design, analysis, construction, testing, and evaluation of mechanical systems for water treatment/distribution, educational, health care, industrial, wastewater treatment/collection, dairy plants, warehousing, vehicle maintenance, residential housing, offices, airport, kitchens, cold region, pharmaceutical, and refrigerated storage facilities. Areas of expertise include:

Fire Science and Fire Protection Engineering:

- Thermodynamics, heat transfer, fluid mechanics, combustion, fire safety, fire spread and development, smoke movement, fire modeling.
- Flammability of materials, flash point, vapor ignition, explosions, fire origin and cause, textile flammability, textile flammability testing, flame retardant textiles, flame resistant textiles.
- Wet, dry, and double interlock preaction sprinkler systems, in-rack systems, ESFR systems, Halon suppression systems, fire pump systems, jockey pumps, vertical turbine fire pumps, water storage tanks and ponds, fire hoses and fire hose appliances, hydraulic analysis.
- Fire alarm systems, heat detectors, smoke detectors, carbon monoxide detectors.

HVAC:

- Heating equipment: Furnaces, boilers, heaters, flues and chimneys, Unit heaters and ventilators, heat pumps. Heat recovery, heat exchangers.
- Cooling equipment: DX, closed circuit fluid coolers, chillers, cooling towers.
- Controls: Temperature and humidity control, safety, energy management, DDC.
- Distribution: Air handlers and ductwork, pumps and piping, noise control, fire safety.
- Ventilation: Outdoor air, sick building syndrome, indoor air quality, air and contaminant movement in buildings, airflow and contaminant modeling.

Plumbing, Water and Sewage:

- Water treatment/distribution: Treatment plants, pumping stations, distribution systems, valves, pumps, piping, chemical feed systems, filtration.
- Domestic cold and hot water: Temperature controls, water hammer and surge suppression, washdown systems, water treatment, flooding, scalding.
- Wastewater treatment/collection: Gravity and pumped, grease interceptors, sludge dewatering, belt filter presses, sludge pumping station, polymer feed system, odor control, chlorination, sand filters, overflows.
- Gas systems: Natural and propane gas, gas piping, regulators, appliances.
- Compressed Air Systems: Air compressors, distribution systems, piping, hose, receivers, regulators, controls.

EXPERT NOT RETAINED

DALE J. CAGWIN, P.E.
Mechanical Engineer

Industrial Systems:

- Process: High pressure air and steam, hydraulic systems, ammonia refrigeration, flash mixing, pumps and controls, flare systems, digester gas systems, engines, generators. Medical gas systems. Explosion-proof equipment.
- Air Quality and Ventilation: Fans, ductwork, exhaust hoods, fans, blowers. Clean air systems, wet scrubbers, carbon absorbers, cyclone separators, biofilters, activated carbon filtration, odor control, battery room ventilation.

Woodworking and Woodworking Machinery:

- Rough carpentry, finish carpentry (including milling trim from rough cut lumber), Built-in furniture, cabinets, woodworking joints.
- Table saws, band saws, mitre saws, circular saws, jig/sabre saws, radial arm saws, planers, jointers, grinders, sanders, hand tools, pneumatic nailers, drills and drill presses, routers, plate joiners, lathes, shapers, dust collection equipment, chain saws.

1999 to present **Fournier Robson & Associates, LLC**
Associate
Provide technical assistance and support to contractors and owners on matters involving HVAC and plumbing systems, and troubleshooting water and wastewater treatment plant problems.

2000 to 2001 **Frey Lutz Corporation**
Mechanical Engineer – Design Build Division
Design, estimate, and manage construction of HVAC and plumbing systems for commercial , institutional, and industrial projects. Member of Safety Committee.

1992 to 1998 **Facilities Design, Inc.**
Associate Principal, Director of Mechanical Engineering
Supervise engineers and designers. Responsible for all mechanical engineering including HVAC, plumbing, fire protection, and process design for institutional, commercial, industrial, and municipal projects. Develop standards, establish schedules and budgets, review all mechanical work. Manage projects for key clients. Responsible for development and maintenance of company computer network and information systems.

1989 to 1992 **PSC Engineers & Consultants, Inc.**
Mechanical Engineer/Project Manager
Responsible for HVAC, plumbing, fire protection, and process system design and specifications for industrial and commercial projects. Prepared proposals, developed new work, served as client contact, managed construction projects

1986 to 1989 **Metcalf & Eddy, Inc.**
Mechanical Engineer
Responsible for HVAC, plumbing, fire protection, and process system design and specifications for municipal and government (Navy and Air Force) projects. Responsible for final review of all HVAC designs.

EXPERT NOT RETAINED

DALE J. CAGWIN, P.E.
Mechanical Engineer

1981 to 1986 **Heat Extractor, Inc.**
Product Development Engineer
Responsible for operation of research and development laboratory for direct contact flue gas heat recovery equipment. Evaluated product safety, performance and materials of construction. Functioned as liaison engineer with Underwriters Laboratories and American Gas Association in obtaining and maintaining equipment certification.

1975 to 1980 **Indian Castle Tire Service**
Provided 24 hour roadside repair and replacement of commercial truck and agricultural tires

PROFESSIONAL CREDENTIALS

Professional Engineer: Connecticut, Maryland, New York, Pennsylvania
Certified Oil Burner Technician: Massachusetts (1985-1988)
Certified Fire Protection Specialist, CFPS, expired
Chairman, Lancaster Township Building Code Board of Appeals, Lancaster, PA, expired
Certified Fire and Explosion Investigator (CFEI), No. 9413-6237, expired
Certified Fire Investigator Instructor (CFII), No. 9413-6237I, expired

EDUCATION

A.A.S. in Civil Engineering, Mohawk Valley Community College, Utica, NY
Additional study in Solar Engineering, 1978-1980
Certificate, Comprehensive Oil Heat Installation and Maintenance Course, New England Fuel Institute, 1985
Pennsylvania State University, Harrisburg, PA campus, 1990
(Experimental Methods for Engineers)
Northeastern University, Boston, MA, 1982-1986
(Calculus Review, Physics Review, Differential Equation 1&2, Dynamic 1&2), Structural Mechanics, Strength of Materials, Economics, Numerical Methods, Thermodynamics, Fluid Mechanics, Heat Transfer, Thermal Design)

Continuing coursework:
Ethical Issues in Forensic Engineering (Live Webinar), PDH Online, April 2017
Non-Destructive Testing Methods for Metal Corrosion, Decatur Professional Development, April 2017
Skyscrapers (Live Webinar), PDH Online, April 2017
Construction Layout (Live Webinar), PDH Online, April 2017
Human Behavior in Fire, Society of Fire Protection Engineers, December 2016
The Lac-Megantic Railway Disaster - A Town Destroyed and 47 Killed, Lessons Learned, NFPA, June 2015
Cigarette Fire Safety: What's Next, NFPA, June 2015
Marina and Boatyard Protection - Compliance Challenges, NFPA, June 2015
Inspecting Facilities for Combustible Dust Hazards, NFPA, June 2015

EXPERT NOT RETAINED

DALE J. CAGWIN, P.E.
Mechanical Engineer

NFPA Standard 13-2016, Standard for the Installation of Sprinkler Systems, Changes, NFPA, June 2015
The Research Road map for Smart Fire Fighting, NFPA, June 2015
NFPA 921, Guide for Fire and Explosion Investigations - Developing the Science of Fire Investigation, NFPA, June 2015
The Fire Investigator as Expert Witness: A Review of NFPA 921 and NFPA 1033, NFPA, June 2015
The Drones are Coming: Incorporating Unmanned Aircraft Systems into the Fire Service of the Future, NFPA, June 2015
Evaluating Flameless Venting Devices for Dust Explosions, NFPA, June 2015
Transient Thermal Response of Fire Fighter Clothing and Helmets in Heated Flow Path Conditions, NFPA, June 2015
Flammability Testing of Plastic Pipe, NFPA, June 2015
NFPA's Combustible Dust Standards, NFPA, June 2015
NYS Ethics Self Study Course, New York State, April 2015
Indiana Rules and Statutes, ACEC Indiana, 2015
Ethics, ACEC Indiana, 2015
Fire Science and Litigation Seminar, Defense Research Institute, 2014
Fire Protection Fundamentals, Decatur Professional Development, 2013
Valve Fundamentals, Decatur Professional Development, 2013
Psychrometrics and its use in HVAC, Decatur Professional Development, 2013
HVAC Variable Refrigerant Flow Systems, Continuing Education and Development, 2012
Thermal Stress and Brittle Fracture of Material, Continuing Education and Development, 2012
Fundamentals of PID Control, Decatur Professional Development, 2012
Fire Cause Determination Using the Revised Chapter 18, NFPA 921, National Fire Protection Association, 2011
Natural Gas Piping and Purging: Safe Work Practices, NFPA, 2011
Flammable and Combustible Liquids in Plastic Containers: Understanding the Code, Case Study Implementation, and New Research, NFPA, 2011
New Requirements in the 2012 NFPA 70E, Standard for Electrical Safety in the Workplace, NFPA, 2011
NFPA Combustible Dust Standards Update, NFPA, 2011
Residential Fire Tenability, NFPA, 2011
Society of Fire Protection Engineers, Introduction to Fire Dynamics Simulator and Smokeview, 2010
Society of Fire Protection Engineers, Principles of Fire Protection Engineering, 2010
Society of Fire Protection Engineers, Engineering Technology Conference, 2010
National Institute of Standards & Technology, 2009 Building and Fire Research Annual Fire Conference, 2009
ASTM International, Major Testing Techniques for Plastic, 2008
2007 National Fire, Arson & Explosion Investigation Training Program
Investigation of Gas and Electric Appliance Fires, 2002
Natural Gas and LPG Fire/Explosion Investigation Seminar, Public Agency Training Council, 2001
National Electrical Code Seminar, National Fire Protection Association, 1999
Automatic Sprinkler System Seminar, National Fire Protection Association, 1993

EXPERT NOT RETAINED

DALE J. CAGWIN, P.E.
Mechanical Engineer

PROFESSIONAL MEMBERSHIPS

American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)
- Technical Peer Reviewer, ASHRAE Journal, 1996-2010
- Past member of Technical Committee (TC) 9.8 Large Building Air Conditioning Applications, TC 1.4 Control Theory and Application, TC 9.1 Industrial Air Conditioning, and Standard 62.1 Ventilation for Acceptable Indoor Air Quality
- Central Pennsylvania Chapter, past president

National Fire Protection Association (NFPA), member
Society of Fire Protection Engineers (SFPE), member
American Society for Testing and Materials Committees: (past membership)
- E05 – Fire Standards
- E05.15 – Furnishings and Contents
- E05.23 – Combustibility
- E05.33 – Fire Safety Engineering
- E05.44 – Fire Safety Engineering
- D13.52 – Textile Flammability

PRESENTATION/PUBLICATIONS

"Fire/Explosion Origin and Cause Investigations," Lorman, 2006
"Fundamentals of Fire Science & Engineering, Robson Lapina, 2001
"Fundamentals of Fire Science & Engineering, Robson Lapina, 2000
"HVAC Design Wastewater Treatment Plants," Water Environment Federation, 1991
"Control Technologies for VOC Emissions," Water Pollution Control Federation, 1990
"Design Considerations for VOC Emission Control Systems at Wastewater Treatment Plants," Water Environment & Technology, June 1990

EXPERT NOT RETAINED