

Overview

Crux Consulting, LLC provides consulting services and performance-based design solutions for code / regulatory compliance, fire, life safety, and security systems. Our purpose is to apply comprehensive knowledge and analytical thinking of industry codes, standards, and modeling to help our clients solve complex challenges.

www.cruxcon.com

Services

- Code compliance reviews and recommendations related to building, fire and life safety and energy codes, hazardous materials, permitting, MEP, OSHA, Process Safety Management (PSM), and Emergency Action Plans (EAPs).
- Detailed engineering design packages for suppression, alarm / detection, fire protection water storage tanks, fire pumps, smoke control, and special hazards.
- Performance-based design / evaluations / peer reviews including fire hazards analysis (FHA), quantitative risk analysis (QRA), modeling (hydraulic, CFD, radiation, egress, structural fire performance), deflagration / explosion analysis, failure mode and effects analysis (FMEA), and dispersion modeling.
- Building systems commissioning for mechanical, electrical, plumbing and fireprotection.
- Construction management, procurement and bidding.

Key Personnel

Brian Meacham, PE – Risk and Regulatory Consulting

Brian Meacham is a licensed Professional Engineer (Fire Protection), a Chartered Engineer (UK), a registered European Engineer (EUR ING), a Fellow of the Institution of Fire Engineers, a Fellow of the Society of Fire Protection Engineers, and a past President of the Society of Fire Protection Engineers. Brian has been in the industry since graduating from Worcester Polytechnic Institute in 1984.

Shane Cherney, PE, P. Eng, CSP – Principal

Shane Cherney is a licensed fire protection and mechanical engineer with experience in code and regulatory consulting, hazard and risk analysis, and fire protection systems engineering. Shane is the owner and founder of Crux Consulting.

Dustin Brand, PE, CBCP – Senior Mechanical Engineer

Dustin Brand is a licensed mechanical engineer and certified MEP system commissioning agent with experience in MEP system design and commissioning for a variety of building types including healthcare, DoD military facilities, higher education, and civic facilities.



Marc Vieno – Architect, Code Official – Senior Consultant

Marc Vieno is a Senior Consultant who specializes in performance-based solutions for architectural challenges by using cutting-edge and innovative thinking to build code-compliant designs. Marc has been in the industry since graduating from the University of Oregon in 2011.

Kyle Christiansen, PE – Senior Fire / Life Safety Engineer

Kyle Christiansen is a licensed fire protection engineer specializing in hazard and risk analysis, code/regulatory/permitting consulting, probabilistic risk analysis / fault tree / event tree modeling, and fire protection systems engineering. He also has experience with fire modeling and statistical analysis software.

Antonio Cicione - Fire Protection Engineer

Antonio Cicione is a licensed fire protection engineer, as well as an adjunct senior lecturer at Stellenbosch University in South Africa. He has provided both fire safety services and structural design services on several multimillion-dollar projects and has extensive experience in conducting fire experiments and modeling structural fire performances.

Bob Pielow - Fire Protection and Safety Engineer

Bob Pielow has over 35 years of experience developing code compliance and fire protection systems for a wide range of complex projects including high rise, stadium, arenas and large-scale assembly, performance arts centers, museums, and both commercial and residential health care. He has a comprehensive knowledge of all major codes utilized in the United States as well as the New International Building Code. This allows his solutions to be developed and successfully negotiated with local building and fire officials. Bob's approach allows owners to obtain approval from various authorities in a cost-effective manner.

John Kubasik, EPC Manager – Industrial Fire and Safety

John Kubasik is a NICET certified technician with a wealth of experience with fire suppression, fire pumps and alarms, gas detection and DCS controls. John has been in the Fire and Safety industry since 1985.

Travis De Goei – Design Manager

Travis De Goei is a NICET Level IV certified technician with experience in design, management, installation, and commissioning of fire protection systems, fire alarm / detection, communications, life safety, voice evacuation and mass notification, special hazard detection, clean agent fire suppression, and others.

Amanda Bogner – PE BEMP

Amanda Bogner is a registered mechanical engineer and is a certified ASHRAE building energy modeling professional (BEMP). Passionate about architecture and sustainability, she is responsible for providing her clients with meaningful energy modeling analysis. Amanda

has extensive experience in energy analysis and possesses an extremely strong understanding of energy codes, energy modeling procedures, and the LEED certification process.

Sectors

- High-rises
- Higher education
- Battery energy storage systems (BESS)
- Oil & gas
- Power generation (RNG, LNG, hydropower, solar)
- Hazardous materials
- Industrial, manufacturing / production, semiconductor facilities
- Data centers
- Marine terminals, ports, and harbors
- Hospitals and ambulatory care
- Department of Defense facilities (UFC)
- Solid waste and wastewater
- Warehouse / storage

Project Highlights

Below is a list of some of our recent work providing code consulting and performance-based solutions:

- Code compliance, fire hazards analysis, and detailed engineering design for flammable liquid storage terminals
- Detailed engineering design for the sitewide fire protection system at a lithium production facility
- FMEA and code consulting services for BESS sites
- Code consulting and smoke control for university building
- Detailed design and construction management for fire protection water system replacement
- Dispersion analysis and blast study for chemical plants
- Ventilation evaluation and integrated system testing / survey
- NFPA 59A leak and fire hazard analysis for LNG facility



Doctor of Philosophy, Clark University, Worcester, MA, 2000

Master of Science, Fire Protection Engineering, Worcester Polytechnic Institute, Worcester, MA, 1991

Bachelor of Science, Electrical Engineering, Worcester

Brian Meacham, PHD, PE, CENG, EURINGDirector, Risk & Regulatory Consulting

Brian Meacham is a licensed Professional Engineer (Fire Protection), a Chartered Engineer (UK), a registered European Engineer (EUR ING), a Fellow of the Institution of Fire Engineers, a Fellow of the Society of Fire Protection Engineers, and a past President of the Society of Fire Protection Engineers. Brian has been in the industry since graduating from Worcester Polytechnic Institute in 1984.

ACADEMIC EXPERIENCE

Brian held the position of Associate Professor (with tenure), Department of Fire Protection Engineering, at Worcester Polytechnic Institute from 2007-2017. He taught courses in performance-based design for fire, human behavior and fire (egress design), fire risk & regulatory policy, and detection and smoke control at the MSc level, and introduction to fire protection system design at the BSc level.

REPESENTATIVE CONSULTING EXPERIENCE

Polytechnic Institute, Worcester, MA, 1984

Registrations

Professional Engineer, CT US, 17906

Professional Engineer (Fire Protection), MA, US, 47238

Chartered Engineer (CEng), Engineering Council, UK, Registration No. 519749

European Engineer (EUR ING), FEANI, Brussels, Belgium, Registration No. 34094

Professional Memberships

International Association for Fire Safety Science (IAFSS), Immediate Past Chair, Trustee

International Code Council,
Professional Member, Chair –
ICCPC Code Development
Committee (2023-2027)

National Fire Protection
Association, Life Member, Past
Chair, Technical Committee on
Fire Risk Assessment Methods

Society of Fire Protection Engineers, Fellow, Past President

Industry Tenure

Since 1984

• Paint Manufacturing Facility, North Carolina, United States.

NON-CRUX PROJECT EXPERIENCE

- Pacific Region Infrastructure Facility / Asian Development Bank, Tokyo, Japan
- Wales Centre for Public Policy, Cardiff University, Cardiff, Wales, United Kingdom
- International Code Council, Washington, DC
- SFPE Foundation, Bethesda, Maryland, United States.
- World Bank, Washington, DC, United States.
- Lund University, Lund, Sweden
- Fire Protection Research Foundation, Massachusetts, United States
- Cladding Safety Victoria, Melbourne, Australia
- Port Authority of New York and New Jersey, New York, New York, United States
- Mott MacDonald, New Jersey, United States
- Kestral Group, Wellington, New Zealand
- Briab Brand & Riskingenjörerna, Malmo, Sweden
- Knauf Insulation, Vise, Belgium
- TNO Technical Research Organization of the Netherlands,
 Delft, the Netherlands
- Scottish Government, Building Standards Division, *Livingston, Scotland*
- Australian Building Codes Board, Canberra, ACT, Australia
- SP Fire Research, Trondheim, Norway
- Ministry of Business, Innovation and Employment, Buildings Housing and Information Division, Wellington, NZ
- Parsons Brinckerhoff, Inc., Atlanta, Georgia, United States
- Aedas / Marina Bay Sands, Singapore
- SonoSite, Bothell, Washington, United States
- Public Utilities Commission, San Francisco, CA, United States
- Valley Metro RPTA, Phoenix, Arizona, United States
- VTT Technical Research Institute of Finland, Espoo, Finland
- University of Massachusetts, Amherst, Massachusetts, United States
- Bay Area Rapid Transit, San Francisco, California, United States
- New York City Transit / MTA, New York, New York, United States

For full resume, please see attachment.

- Sandoz, Switzerland
- ITT Sheraton. Italy, United States
- Beznau Nuclear Power Plant, Switzerland
- Tungsram / G.E. Lighting, Hungary
- U.S. Department of Veterans Affairs, United States
- U.S. General Services Administration, United States
- G.E. Plastics, Indiana, United States
- National Archives, Ottawa, Canada
- 101 Federal Street, Massachusetts, United States



Master of Science, Architectural Engineering, University of Nebraska, Lincoln, 2009

Bachelor of Science, Architectural Engineering, University of Nebraska, Omaha, 2008

Certificate, Fire Protection
Engineering, Worcester
Polytechnic Institute (WPI), 2011

Registrations

Professional Engineer, Nebraska, US, #E-14729 - Fire Protection Engineer/Mechanical Engineer

Professional Engineer – Fire
Protection, additional
jurisdictions:
South Dakota, US, #12506
Missouri, US, #2015011991
Colorado, US, #0050134
Minnesota, US #52465
Massachusetts, US, #51460
Alaska, US, #14786
Arizona, US, #74827

Utah, US, #9661810-2202 California, US, #2193

Shane Cherney, PE, P.ENG Principal | Fire Protection Engineer

Shane Cherney is a licensed fire protection and mechanical engineer with experience in code and regulatory consulting, hazard and risk analysis, and fire protection systems engineering. Shane is the owner and founder of Crux Consulting.

RELEVANT EXPERIENCE

- Commonwealth LNG Fire Protection Water Design Verification, Cameron, Louisiana, United States.
- El Dorado Lithium Facility Fire Hazards Analysis, *Arkansas, United States.*
- Fire Protection Design for Antigua / Caribbean LNG, Antigua.
- El Dorado Lithium Facility Fire Hazards Analysis, *Arkansas, United States.*
- Lee County RNG for Ameresco, United States.
- Fire Hazards Analysis and NFPA 59A Study for the Lynn LNG
 Facility for National Grid, Lynn, Massachusetts, United States.
- Fire Hazards Analysis and NFPA 59A Study for the Haverhill LNG Facility for National Grid, Haverhill, Massachusetts, United States.
- Fire Protection Basis of Design for Magnolia Renewable
 Natural Gas, Summerdale, Alabama, United States.
- Monitor Cooling Upgrade Project for the Hartwell Energy Facility, Hartwell, Georgia, United States.
- BRP Lincoln I Solar Fire Safety Study, Lincoln, Nebraska, United States.
- MUD LNG Fire Alarm Study Report, Omaha, Nebraska, United States.

NON-CRUX PROJECT EXPERIENCE

- 174 Power Global Corp., East River Site Battery Storage, New York, United States.
- Alliant Energy Corporation, Alliant-Marshalltown OE, Ackley, Franklin, Iowa, United States.

Pennsylvania, US, #PE095007 Illinois, US, #62.075786 South Carolina, US, #42048 North Carolina, US, #55611 lowa, US, #ENG-21-00596 Kansas, US, #28620 Maryland, US, #05 - 61320; Michigan, US, #6201312890APP23 New York, US, #108956-01 New Jersey, US, #2764811 Wyoming, US, #PE18746 Oregon, US, #103891PE Ohio, US, #PE.89832 Texas, US, #144390 Alberta, Canada, #212855 Ontario, Canada, #100549393

Professional Engineer –

Mechanical and Fire Protection –

Hawaii, US, #PE-19065

Nevada, US, #31864

Professional Memberships

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), 2010

Society of Fire Protection Engineers, Great Plains Chapter, 2010

Industry Tenure

Since 2006

- Bonneville Power Administration, 500kV Castle Rock
 Substation, Washington, United States.
- Bonneville Power Administration, Morrow Flat Substation 230
 kV/115 kV Substation, Oregon, United States.
- Cty & Co Honolulu Dpt Env Svc, CCHHPWR FacExpansion Solid Waste to Energy Facility Third Boiler Expansion, Ewa, Honolulu, Hawaii, United States
- City of Westminster, Semper High-Service Pump Station (HSPS) Repair and Rehabilitation (R&R), Westminster, Colorado, United States
- Doosan GridTech, Austin Energy Pilot ESS, United States;
 SEATTLE, Washington, United States.
- Duke Energy, EEOC1 Belews Creek 2020, Belews Creek, North Carolina, United States
- Eagle LNG Partners, Talleyrand Marine Terminal LNG Fuel
 Depot, Jacksonville, Florida, United States.
- Hawaiian Electric Co. Inc., HECO-Dry Vault Guidelines, Honolulu, Honolulu, Hawaii, United States.
- McKenzie Electric Coop, Service Center Preliminary Design, Watford City, McKenzie, North Dakota, United States.
- MEI LLC., National Grid HX Foam System Design for Two LNG Plants, Waltham, Middlesex, Massachusetts, United States.
- Metropolitan St. Louis Sewer District, MSD-Grand Glaize Bldg
 Electrical, Fenton, St. Louis, Missouri, United States.
- Moorhead Public Service, MPS High Service Pump Station Construction Phase, Moorhead, Clay, Minnesota, United States.
- Oklahoma Gas and Electric Company, Red Bud Water
 Design Phase 2, Luther, Oklahoma, Oklahoma, United States.
- Omaha Public Power District, OPPD Facil Assmt 2020, Nebraska, United States.
- Snohomish County PUD, Snohomish County PUD MESA
 Battery Energy Storage System, Washington, United States.
- USAC E Baltimore District, Intelligence, Surveillance, and Reconnaissance (ISR) Facility, Norfolk, Norfolk City, Virginia, United States.



Master of Architectural Eng, Architectural Engineering, University of Nebraska, Lincoln, 2006

Bachelor of Science, Architectural Engineering, University of Nebraska, Omaha, 2005

Registrations

Professional Engineer, Nebraska, US, #E-13574 -Mechanical Engineer

Certified Building Commissioning Professional (CBCP), The Association of Energy Engineers

Professional Memberships

American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

Industry Tenure

Since 2005

Dustin S. Brand, PE, CBCP, LEED AP

Sr. Mechanical Engineer Commissioning Agent

Dustin Brand is a licensed mechanical engineer and certified MEP system commissioning agent with experience in MEP system design and commissioning for a variety of building types including healthcare, DoD military facilities, higher education, and civic facilities.

RELEVANT EXPERIENCE

- Ft. Jackson AHU Ventilation Assessment, Columbia, SC, United States.
- Veterans Affairs West Palm Beach Replace Boilers –
 Dispersion Analysis, West Palm Beach, FL, United States.
- Veterans Affairs Oklahoma City Replace Cooling Towers –
 Dispersion Analysis, Oklahoma City, OK, United States.
- USACE Construct Combat Arms Training Maintenance (CATM) Facility - MEP Cx and QFPE, US Military Yokota Air Base, Japan.
- VA Lovell Expand SPS—Dispersion Analysis, Chicago, IL, United States

NON-CRUX PROJECT DESIGN EXPERIENCE

- Veterans Affairs Hospital New Build, Tulsa, OK, United States.
- CHI Health Clinics (3 Locations), Omaha/Lincoln, NE, United States.
- Veterans Affairs Hospital New Build, Omaha, NE, United States.
- Phelps Memorial Hospital Major Renovation, *Holdrege, NE, United States*.
- Misawa Air Base Major Hospital Renovation, US Military Misawa Air Base, Japan.
- Yokota Air Base Major Hospital Renovation, US Military Yokota Air Base, Japan.
- Peterson Dental Clinic New Build, Peterson Air Force Base,
 Colorado Springs, CO, United States.

• CHI Bergan Mercy Lab Major Renovation, Omaha, NE, United States.

NON-CRUX PROJECT MEP COMMISSIONING EXPERIENCE

- Ft. Knox Medical Clinic New Build Commissioning, Ft. Knox, KY, United States.
- Mayport LCS Office Building New Build Commissioning, Jacksonville, FL, United States.
- Camp Kinser Tower 869 Renovation Commissioning, US Military Camp Kinser, Japan



Bachelor of Science, Biology and Chemistry, Portland State University, 2005

Master of Architecture, University of Oregon, 2011

Registrations and Certifications

ICC Certified International
Building Code Plans Examiner

ICC Certified International Fire Code Plans Examiner

ICC Certified Accessibility Plans Examiner and Inspector

FSC Certified Firestop Inspector

Industry Tenure

Since 2005

Marc Vieno

Fire & Life Safety Consultant

Marc's unique background in both engineering and architecture brings creative solutions to building code issues. Marc is proficient in building code analysis, egress modeling, PyroSim, Pathfinder and Bluebeam.

RELEVANT EXPERIENCE

- Neuberger Hall Renovation Portland, Oregon
- HarborSky Apartments Portland, Oregon
- Porter Hotel Portland, Oregon
- Metrolinx Ontario Line Station Code Support and Platform Egress Toronto
- TTC Line 1 Emergency ventilation system and layout design Toronto
- Nike World Headquarters Smoke Control and Egress Modeling Portland, Oregon
- I-5 Rose Quarter Cap NFPA 502 Engineering Report Portland, Oregon
- Saudi Code at King Abdullah Economic City, Saudi Arabia



Master of Engineering, Fire Protection, Worcester Polytechnic Institute, 2016

Bachelor of Engineering, Chemical Engineering, University of Connecticut, 2012

Registrations

Professional Engineer -Fire Protection, Connecticut, US, #PEN.0031752

Professional Engineer -Fire Protection, Guam, US, #2124

Professional Engineer -Fire Protection, Kentucky, US, #36130

Professional Engineer -Mechanical, Maine, US, PE16559

Professional Engineer -Fire Protection, Massachusetts, #56097

Kyle J. Christiansen, PE

Senior Fire and Life Safety Engineer

RELEVANT EXPERIENCE

- Fire Hazards Analysis and NFPA 59A Study for the Lynn LNG Facility for National Grid, Lynn, Massachusetts, United States.
- Fire Hazards Analysis and NFPA 59A Study for the Haverhill LNG
 Facility for National Grid, Haverhill, Massachusetts, United States.
- Fire Protection Basis of Design for Magnolia Renewable Natural Gas, Summerdale, Alabama, United States.
- Monitor Cooling Upgrade Project for the Hartwell Energy Facility, Hartwell, Georgia, United States.
- Code / Fire Hazard Analysis and Detailed Engineering Fixed Foam Suppression Design for the Stolthaven Houston Terminal, Houston, Texas, United States.
- Code / Fire Hazard Analysis and Detailed Engineering Fixed Foam Suppression Design for the Stolthaven New Orleans Terminal, New Orleans, Louisiana, United States.
- Code / Fire Hazard Analysis and Detailed Engineering Fixed Foam Suppression Design for the Corpus Christi Polymers Site, Corpus Christi, Texas, United States

NON-CRUX PROJECT EXPERIENCE

- Hiwassee Hydro Plant Fire Protection Upgrade Phase 1 Study for the Tennessee Valley Authority, Murphy, North Carolina, United States
- Lynn LNG Foam Detailed Engineering Design for National Grid, Lynn, Massachusetts, United States
- Holtsville LNG Fire Protection Water Demand Study, Holtsville, New York, United States
- Fire Hazards Analysis and NFPA 59A Study for Temporary LNG
 Facility at National Grid, Rhode Island, United States
- Salem Fire Hazards Analysis and NFPA 59A Study for National Grid, Salem, Massachusetts, United States
- Exeter Foam Fire Protection Detailed Engineering Design for National Grid, Exeter, Rhode Island, United States.

Professional Engineer -Fire Protection, New Hampshire, US, #16640

Professional Engineer -Fire Protection, North Carolina, US, #49921 -Fire Protection Engineer

Professional Engineer -Fire Protection, Rhode Island, US, #PE.0013459

Professional Engineer -Fire Protection, South Carolina, US, # 41968

Professional Engineer -Fire Protection, Vermont, US, #18.0134652

Professional Memberships

Society of Fire Protection Engineers, National, 2014

Society of Fire Protection Engineers, Charlotte Chapter, 2019

Industry Tenure

2012

- South Yarmouth Boiloff Gas Compressor Upgrade for National Grid, South Yarmouth, Massachusetts, United States.
- Turner Cut and Whisky Slough Fire Protection Upgrades for Pacific
 Gas & Electric, Stockton, California, United States.
- Fire Probabilistic Risk Analysis for the Comanche Peak Nuclear Power Plant, Glen Rose, Texas, United States.
- Fire Probabilistic Risk Analysis for the AP1000® Nuclear Power Plant, United States.
- NFPA 801 Fire Hazards Analysis for the Columbia Fuel Fabrication
 Facility, Columbia, South Carolina, United States
- Fire Probabilistic Risk Analysis for the Onagawa Nuclear Power Plant, Onagawa, Japan.
- Performance-Based Fire Modeling for the Beznau Nuclear Power Plant, Beznau, Switzerland.



Bachelor of Science, Industrial Technology, University of Nebraska at Omaha, 2004

Associate of Science, Fire Protection, University of Nebraska at Omaha, 2004

Coursework in Fire Protection and Safety Engineering Technology, Eastern Kentucky University, 2020

Registrations and Certifications

NICET Fire Alarm Systems, Level IV, Nebraska, US, #109733, October 2021

NICE T Special Hazard Systems, Level II, Nebraska, US, #109733, October 2021

State of Iowa Alarm System RME AS-0674

State of Nebraska Fire Alarm Inspector License #668

State of Nebraska Fire Alarm Installer License #23153

Travis De Goei

Design Manager

RELEVANT EXPERIENCE

- Air Force Civil Engineering Center, T_Tyndall 2 Flght Ops United States
- Brookhaven National Laboratory (BNL), Core Facility
 Revitalization Design Services Data Center (B725) Upton,
 New York, United States
- National Park Service, T EVER Housing Full Design United States
- New York City Department of Sanitation, DSNY, Bronx 9/10/11 Mahwah (Township of), Bergen, New Jersey, United States; New York, New York, New York, United States
- NYCDEP-BEDC, DEP/SWD/OAKWOOD TRC Brooklyn, Kings, New York, United States; Corona, Queens, New York, United States
- University of Maryland Medical Center, Comprehensive Cancer Center Baltimore, Maryland, United States
- University of New Mexico Hospitals, New Hospital Tower Albuquerque, New Mexico, United States
- USACE Charleston District, B8 & B60- Fire Prot. Title II, 0, 0,
 Virginia, United States; California, United States
- Wildlife Foundation of Florida, WFF/BC/TO#9 Const Admin RH Florida, United States

Manufacturer Honeywell
Gamewell-FCI fire alarm
factory trained and certified

Manufacturer Ansul, Kidde, Janus, and Minimax clean agent fire suppression system factory trained and certified

Manufacturer Retrotec enclosure integrity testing Level II factory trained and certified

Professional

Memberships

Member/board member,
Society of Fire Protection
Engineers, Great Plains Chapter

Nebraska Association of Alarm Companies

Fire Suppression Systems
Association

National Independent Fire Alarm Distributors

Industry Tenure

Since 2004