

Resume

Jason R. Florek, Ph.D., P.E.

Senior Safety and Security Engineer

Background

Jason Florek has studied and analyzed structures subjected to blast loading for 12 years. Dr. Florek has provided direct blast design support for numerous government, military, and industrial clients in evaluating new and existing construction to possible high explosive, vapor cloud, or other events capable of producing high pressure loads or hazardous fragments. He uses dynamic single-degree-of-freedom and other analysis methods to meet applicable guidelines and structural response or risk-based design criteria.

Dr. Florek has extensively used finite element analysis software to model structural systems and experimental test set-ups. These include window and CMU wall catching systems, blast door assemblies, projectile mitigation systems, steel and aluminum frames, conventionally reinforced and innovative concrete panels, crash bollards, metal trailers, and containment domes. Having evaluated occupied buildings to accidental explosions as part of over 20 facility siting/ quantitative risk assessment (QRA) studies in the US and abroad, he has generated conceptual upgrade design and/or IFC packages for dozens of buildings subject to exterior blast threats, which include steel frame, pre-engineered, cast-in-place concrete, precast concrete, CMU, brick, stone, and modular constructions.

Dr. Florek has experience in the blast design of curtain wall systems and strengthened structures to withstand internal detonations, determining blast load propagation from vented explosions and from repeated firing of weapons at test ranges, performing fragment projection calculations and quantity-distance (QD) assessments, designing barrier walls, and developing explosive site safety documentation using various design tools and following ASCE, CSA, DoD, GSA, ISC, and Army and Navy specific design guidelines. He has also been active in developing material for and instructing sections of blast design short courses.

Representative Work Experience

- **Air Force Blast Mitigation Development Program for Masonry and Glazing Catch Systems:**
Developed and validated LS-DYNA finite element models of CMU walls (with and without window openings) and vendor polymer materials to match/predict shock tube test results of CMU and window catching systems. Constructed pressure-impulse curves for system applicability based on extended finite element runs.
- **Blast Design of Containment Domes, Dow Chemical/Saudi Aramco, Undisclosed Location:**
Assessed four preliminary containment dome designs to potential HE or vapor cloud explosions with LS-DYNA. Determined required upgrades to produce acceptable system response in terms of steel plate thickening, reduction of dome stiffener spacing, or addition of spray-on concrete.

- **General Blast Support for Suncor Facility, Mississauga, Ontario, Canada:** Developed detailed upgrade designs and subsequent drawings for two control rooms subject to defined worst-case blast loads on each surface. Reviewed calculation sets submitted by blast door vendor. Provided ongoing blast support with respect to turnaround activities associated with each control room, including siting requirements of occupied trailers and tent structures per API guidelines.
- **Risk-Based Detailed Blast Design of Sunoco Control Rooms, Various Locations in OH & PA:** Determined structural retrofits for four control rooms of varying construction (load-bearing CMU walls, steel frame with brick infill walls, or pre-engineered metal building) to meet client-specified risk threshold. Developed IFC drawing packages with general notes and full connection details. Reviewed calculation sets submitted by blast door vendor.
- **Antiterrorism Blast Design of St. Thomas Courthouse, St. Thomas, Ontario, Canada:** Developed interior blast loads from a mail bomb scenario. Designed shipping/receiving area to sustain developed blast loads with required concrete cell flexural, tension, and shear reinforcement, in addition to exterior design threats. Reviewed various drawing submissions to ensure intent of blast design was realized. Provided construction administration support for issues arising post 100% design drawing submission.
- **Blast Vulnerability Assessment of Parliament Hill East Block, Ottawa, Ontario, Canada:** Teamed with University of Ottawa to develop structural models of historic stone building construction. Determined blast load profiles acting on building surfaces from postulated bomb scenarios. Developed conceptual retrofits for wall, roof, door, and window components to meet various levels of protection while preserving historic aesthetics.
- **Preliminary Consequence Evaluation of Port Canaveral, Cape Canaveral, FL:** Assisted in developing blast scenarios due to an accidental or intentional explosion event originating within or near a port fuel terminal. Examined direct effects to surrounding buildings and docked ships, as well as of general thermal and toxic releases. Recommendations were provided to limit risk to identified areas of high population.
- **Blast Design of Navy Advanced Energetics Research Laboratory Complex, Indian Head, MD:** Developed interior blast loads from an accidental explosion. Designed eleven laboratories and two storage bays to contain and/or vent explosive material used within complex in accordance with UFC 3-340-02, NAVSEA OP 5, and subsequent reviewer comments. Specified proper cell reinforcement layouts, as well as potential debris throw of vent panels to design interior loads and response to developed wrap-around loads.

- **Blast Analysis and Explosive Safety Support for G&W Systems Tech Data Facility, Picatinny Arsenal, NJ:** Determined general wall and roof construction requirements of two buildings and two slug butts subject to repeated blast and impact events due to firing of large and small caliber weapons. Generated explosive safety site plan submission in accordance with Army and DoD standards for ammunition storage facility supporting firing range activities, including pertinent Q-D arcs.

Professional Affiliations

American Society of Mechanical Engineers

Education

Rutgers University, New Brunswick, New Jersey

Doctor of Philosophy, Mechanical Engineering (2007)

Dissertation Title: **Study of Simplified Models of Aircraft Structures Subjected to Generalized Explosive Loading**

Master of Science, Mechanical Engineering (2005)

Thesis Title: **Study of Simplified Models for the Large Deflection of Thin, Rectangular Plates Subjected to Blast Loading**

Bachelor of Science, Mechanical Engineering (2000)

Registrations

Professional Engineer, Virginia (2013 - 0402052265)

Employment History

Senior Engineer, Stone Security Engineering, PC (2014 – present)

Project Engineer, BakerRisk, San Antonio, TX and Washington, DC (2007 – 2014)

Graduate Fellow/Course Instructor, Rutgers University, New Brunswick, NJ (2002 – 2007)

Junior Engineer/Draftsman, The Knoller Companies, Inc., South Plainfield, NJ (2000 – 2002)

Publications

El-Domiaty, K.A., Florek, J.R., Mendoza, P.J., Christiansen, A.P., Hofmann, P., **"Numerical Simulation of Advanced Micro-Reinforced Concrete Composite Systems Subjected to Blast Loading,"** ACMBS-VI Conference, Kingston, Ontario, Canada, May 2012.

Florek, J.R., El-Domiaty, K.A., Drury, T.M., **"Experimental and Computational Evaluation of Polyurethane Catching Systems for Windows Subjected to Blast Loading,"** 82nd Shock & Vibration Symposium (SAVIAC), Baltimore, MD, November 2011.

Florek, J.R., El-Domiaty, K.A., Polcyn, M.A., **"Design Aspects for New Construction of a Test Firing Range,"** 14th International Symposium on Interaction of the Effects of Munitions with Structures (ISIEMS), Seattle, WA, September 2011.

Florek, J.R., Edel, M.T., **"Dynamic Nonlinear Finite Element Analysis of Modular Metal Buildings in Petrochemical Facilities,"** 2011 AIChE Spring Meeting/7th Global Congress on Process Safety, Chicago, IL, March 2011.

El-Domiaty, K.A., Florek, J.R., Drury, T.M., **"Experimental and Computational Evaluation of Polyurea Catching Systems for Masonry Walls Subjected to Blast Loading,"** 81st Shock & Vibration Symposium (SAVIAC), Orlando, FL, October 2010.

Florek, J.R., El-Domiaty, K., **"Exploring DDESB Acceptance Criteria for Containment of Small Charge Weights,"** 34th DDESB Seminar, Portland, OR, July 2010.

Florek, J.R., Benaroya, H., **"The Large Deflection Response of Thin Plates to Generalized Explosive Distribution,"** ASME International Mechanical Engineering Congress and Exposition (IMECE), Boston, MA, November 2008.

Florek, J.R., **"Extension of Terrestrial Excavation Mechanics to Lunar Soil,"** Rutgers Symposium on Lunar Settlements, Piscataway, NJ, June 2007.

Florek, J.R., Benaroya, H., **"The Response of Aircraft Structures Subjected to an Explosive Loading of Generalized Distribution,"** 4th International Aviation Security Technology Symposium, Washington, DC, November 2006.

Florek, J.R., Benaroya, H., **"A Large Deflection Model for Thin, Rectangular Plates Subjected to Blast Loading,"** 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Newport, RI, May 2006.

Florek, J.R., Benaroya, H., **"Pulse-Pressure Loading Effects on Aviation and General Engineering Structures—Review,"** Journal of Sound and Vibration 284: 421-453, 2005.