

Threat-Risk Assessment, Blast Mitigation and the Design-Basis Threat

A Foundation Course

(renamed Blast Mitigation, Security and the Design-Basis Threat course)

Course presented by

Ken Clupp, CD, P.Eng., C.Tech., PSP
Director and Principal Consultant, DSB Security Consulting

Juri Kasemets, CD, P.Eng., M.Eng., MBA
President, EMG Explosives Management Group

Course description

This is a one-day course that covers the basics of blast theory and fundamentals of conducting a Threat Risk Assessment (TRA) to develop the Design-Basis Threat (DBT) in order to effectively apply Canadian Standard S850-12 *Design and Assessment of Buildings Subjected to Blast Loads*. The S850 Standard is intended for use by engineers and architects in the design of new buildings and the assessment of existing buildings to adequately mitigate the effects of blast threats. This is not an S850-specific course but the Standard is covered on the course as we show how and when to apply the basics of risk assessment, elementary blast theory, an understanding of explosives effects and applicable security principles.

The threat is rarely known due to the unpredictable nature of the adversary (generally assumed to be a terrorist of one sort or another). Prior incidents are a poor indicator of probability so that – unlike snow or wind loads – 50 or 100 year probability tables cannot be used. Instead, an Intelligence Assessment (IA) must be performed to establish a DBT. The DBT is the basis for the mitigation design, though it must never be confused with being *the* threat. It is only the threat upon which the design is based. Engineers are schooled to use probability tables for the various live loads and many will not be comfortable with the DBT approach. This course is designed to give them sufficient understanding of the process to apply it with confidence.

To reiterate, the engineer/architect applying CSA S850 does not determine the threat. Input to the process is the DBT which is provided by the building owner (who will probably use a specialist security consultant) as determined by a threat assessment and available intelligence. In rare cases, the DBT may be set by the Authority Having Jurisdiction (AHJ). Except for the case where the AHJ sets the DBT, the engineer/architect is required by S850 to conduct and document a “screening assessment” (review of the basis for the establishment of the DBT) to ensure it is based on valid assumptions and sound judgement. While the engineer (no more than

the owner) can predict when or how an adversary will strike, the engineer can – and must – ensure assumptions about barriers, stand-off distances, etc. are based on valid criteria.

The S850 is intended for use by engineers and architects in the design of buildings/facilities and the assessment of existing buildings to mitigate the effects of blast. While the technical aspects are also applicable to accidental explosions, the S850 is essentially a guide to designing for the mitigation of blasts due to terrorism and the like. S850 is unique. Unlike regular design or assessment standards, the designer cannot rely on code-specified loads. The owner must specify the loads – but the designer must exercise due diligence (through a formal review process) to ensure the premises for the DBT are realistic. This course will demonstrate how to do this when working with clients both knowledgeable and not so knowledgeable.

This course should be considered a prerequisite for any engineer or architect planning to design or assess buildings/ facilities in accordance with the S850. Most advanced courses covering the technical aspects of the S850 will assume the user already has an understanding of the basics of blast, threat and risk assessment methodology and mitigation measures such as establishing stand-off and is ready to learn how to apply the S850 to design for a given DBT and desired Level of Protection (LOP).

Target audience

Engineers and architects (either working for the building owner/manager to determine the DBT OR using CSA S850 to design new buildings or retrofit existing buildings), facility owners/manager, project managers, organizations conducting risk assessments, insurance companies. Even previous attendees of CSA S850 introduction courses will benefit.

Course outline

Introduction – systems approach to security; design philosophy; level of protection (LOP); risk determination and risk acceptance; resilience – expecting the unexpected; counting the cost;

Risk – security risk management; TRA (fundamentals, ASIS, HDS, Harmonized and DRDC approach to the Threat and Risk Assessment); Vulnerability Assessments (VA), threat agent and consequence (impact) evaluation.

Security – proactive measures (physical security, screening); business continuity planning; reactive measures (evacuation, lock-down, search).

Barriers against VBIEDs – US, UK and other government test standards, application

Design-basis Threat (DBT) – undesirable events; explosive device – man-portable external; man-portable internal; mailed or delivered; vehicle borne IED (VBIED); vehicle ramming; ballistic attack – active shooter; ballistic attack – standoff weapon; ballistic attack – small arms; suicide/homicide bomber; coordinated or sequential attack; CBR release.

Explosives – sources and types; commercial and homemade; IEDs; aggressor tactics; reasons for bombing

Blast theory – blast effects; blast loading – incident and reflected pressures; cratering; ground vibrations; scaling; blast injuries; TNT equivalence; standoff; focusing; progressive collapse; retrofit/mitigation.

Window protection – glazing hazard mitigation; blast mitigation glazing test standards and selection of performance conditions.

Protection of Other Building Elements – general approach, concrete block wall retrofits

Response to dynamic loads – pressure-impulse (P-I) diagrams; single degree of freedom (SDOF); finite element analysis.

Additional – review of select reference materials; review of select bombings against buildings; group activity - case studies; US Force Protection and Whole Building Design Guidelines.

Canadian Standards – CSA S850-12 and S851-12

Contact Information for Instructors

Juri Kasemets, P.Eng.

President, EMG Explosives Management Group www.explosivesmanagement.com
emgroup@ns.sympatico.ca 902-222-5097

LinkedIn: ca.linkedin.com/pub/juri-kasemets-p-eng/

Ken Clupp, CD, P.Eng., C.Tech., PSP

Director and Principal Consultant

DSB Security Consulting

Dsbsecurityconsulting.com info@dsbsecurityconsulting.com

kencluppsb@gmail.com 613-284-2320

Linked-In: ca.linkedin.com/in/kencluppsecurityconsultant