

Fundamentals of Explosive for Military, Law Enforcement Officers & Related Professionals

Overall Objective: That those going into the present war zones be familiar with the type of IED devices and what type homemade explosives (HME) they may encounter and that they are aware of potential methods of dealing with them.

Objectives: The methods of modern warfare have change. Our warfighters need to be prepared for new threats and use of new tactics. This course focuses on the fundamentals of explosives and explosive devices. What materials and devices are likely to be the threat, how do we counter them, what tools are available to detect, to counter. Upon completion of this course the student will be able to address the following:

- What makes a material explosive—the basics;
- Designations of explosives as homogeneous, heterogeneous, non-ideal, enhanced blast, thermobaric, liquid, fuel-air;
- Which explosive are likely to be used by terrorists and others of evil intent;
- Indicators/signatures of illicit explosive synthesis
- Principles of explosive initiation
- Principles of pyrotechnics
- Understand how a shaped charge functions, how to make one, how it differs from an EFP.
- Available technology for detecting explosives and their limitation
- What is the make up of an explosive device
- Construction of improvised explosive device (IED)
- How does one disrupt an explosive device

This class can be offered in two formats. The 18 hours of lecture can be offered across 5 mornings and supplemented with 3 hours of lab/field experience 4 afternoons. If your location will not allow for a practicum, the lectures will be given over a course of two and a half days. If a practicum is possible, small-quantities of various HME will be prepared. Their power and methods of destroying them will be demonstrated.

Sergeant William Qualls is the Bomb Squad Commander of the Massachusetts State Police Bomb Squad. He is a 17 year veteran of the Department, with 12 of those years assigned to the Squad on a full time basis. He is a nationally recognized speaker/instructor on homemade explosives (HME's) and Bomb Squad Operations in threat environments. He is a certified Hazmat Technician, Explosive Breacher and Explosive K9 Handler. Sgt Qualls holds a Masters Degree in Criminal Justice and a BA in Finance/ Economics from the University of MA, Boston.

Dr. Steven Todd honorable retired from the Navy in February 2001 as a Master Chief Petty Officer after serving 21 years. Steve spent 19 out of the 21 years as an Explosive Ordnance Disposal (EOD) Technician. His last seven years in the Navy he served at Naval Special Warfare Development Group (NSWDG) as the senior enlisted of operations. Before retiring, he earned his Bachelor of Science degree in Mathematics. Upon retirement, he joined Sandia National Laboratories as a technical staff member. His research work and interests involve all aspects of energetic materials and their

applications. While at Sandia, he extended his level of education by earning a Master of Science degree in Engineering Mechanics, specializing in Explosive engineering, and a Doctorate degree in Materials Engineering. Steve has accumulated over 30 years of experience working with and using energetic materials to render safe all types of foreign and domestic weapons, render safe any type of improvised devices, and to gain access through many types of materials and composites.

Dr. Jimmie C. Oxley is Professor of Chemistry at the University of Rhode Island (URI) and co-Director of the Department of Homeland Security Center of Excellence in Explosive Detection, Mitigation, and Response, and co-Director of the Forensic Science Partnership of URI. She earned a Ph.D. from the University of British Columbia (Chemistry) and joined the faculty of New Mexico Tech where she founded a Ph.D. program in explosives and created a Thermal Hazards Research group. Oxley's lab specializes in the study of energetic materials—explosives, propellants, pyrotechnics. Dr. Oxley has organized numerous symposia and short courses for government and industrial laboratories on topics ranging from hazards analysis to bomb threats. Dr. Oxley is an elected fellow of the North American Thermal Analysis Society and a reviewer for the FBI, NSF, and National Academy of Sciences (NAS) National Research Council (NRC). She has served on six NRC panels--Military Science Board advising the Army on Chemical Weapon Destruction (1998-99); Chemistry Board advising ATF & Congress on the Committee on Marking, Rendering Inert, & Licensing of Explosive Material (1997-98); National Material Advisory Board (NMAB) advising the FAA on Commercial Aviation Security (1995-98); the Manufacturing Board's Advanced Energetic Materials (2001-02); the Naval Studies Board's Determining Basic Research Needs to Interrupt the Improvised Explosive Device Delivery Chain.(2005-08); the Army Research Lab's Armor and Armaments panel (2009-11). Dr. Oxley has authored 80 papers on energetic materials. She has worked on law enforcement issues [with the FBI simulating the 1993 WTC bombing, with the UK Forensic Explosive Lab examining large fertilizer bombs, and with ATF studying the behavior of pipe bombs.