# Professional Military Education Program of Instruction

## Blast Overpressure (BOP) Exposure Mitigation, Brain Health, and Performance Readiness

Framework developed by:
OASD(Health Affairs)
ODASD(Health Readiness Policy and Oversight)

# Overall: Topics Covered

- Background of blast overpressure (BOP)
- Impacts that BOP exposures may have on brain health and performance
- Common training environments where BOP exposure occurs
- Ways to minimize or prevent BOP exposure for:
  - Trainees, instructors, range control operators, & observers, etc.
- DoD Policies and Guidance related to BOP exposure
- Common resources

# Overall Learning Goals

## Overall Learning Goals

- At the end of this Program of Instruction (POI) on BOP safety, you will be able to:

1. Recognize your surroundings and implement safety measures to mitigate unnecessary BOP exposures
2. Find common, easily accessible resources and guidance for yourself and others

Sections


Understanding Blast Overpressure (BOP) Exposure on Health and Performance Effects

Mitigating Low-Level Blast Risks

Policies and Responsibilities


Resources You Can Use

# Background (1 of 3)

A brief and incomplete discussion of the growth of concern about possible changes to the brain from blast overpressure.

Blast overpressure seems to be associated with brain and organ injury **in the absence of noticeable physical signs or symptoms**.

## ➢ World War I

- Exposure to blast events, in the absence of obvious physical injury from shrapnel or impact from flying objects, was associated with cognitive and physical dysfunction in some exposed Service members -- affected individuals were described as having experienced **"Shell Shock".**

## ➢ World War II, Korean Conflict, Vietnam War

- Similar relationships between exposure to substantial blast events and Service member dysfunction were reported.

# Background (2 of 3)

## ➢ Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF)

- The development and refinement of improvised explosive devices (IED) lead to high rates of exposure to substantial blast overpressure events among at-risk Service members.
- Traumatic brain injury (**TBI**) diagnoses and neuropsychological disorders (e.g., post-traumatic stress disorder (**PTSD)**) became signature wounds of these conflicts.
- To improve the understanding of the nature of IED-related blast events and Service member injuries, blast overpressure measurement and recording devices were developed and issued to Service members at risk of experiencing IED events.
- These devices captured important data regarding the nature of IED-generated shockwave related overpressure exposures events.
- Interestingly, in addition to the expected IED-related blast overpressure events that were recorded, substantial numbers of blast overpressure events were also recorded.
- Ultimately, it was determined that most of these unexpected blast overpressure exposure recordings had occurred during routine weapons training exercises.
- Overall, more than **2/3** of all recorded blast exposure events had occurred in training.

# Background (3 of 3)

- Findings from measurement and recording of blast events among relatively small numbers of Service members during OEF and OIF identified training as an important source of acute blast overpressure exposure.
- In 2005, Dr. Bennet Omalu first described pathological changes in the brains of deceased former professional football players who had endured many blows to the head during careers in the National Football League.
- Anecdotal reports to physicians by Service members experiencing cognitive, physical and functional changes and challenges raised concerns that long-term repeated exposures to BOP events might also be associated with long-term pathological changes.
- Research is currently underway to assess possible pathological changes in the brains of deceased military Service members who had reported similar patterns of dysfunction and difficulty.

# Warfighter Brain Health Initiative

On 1 October 2018, the Deputy Secretary of Defense provided his direction for a Comprehensive Strategy and Action Plan for Warfighter Brain Health

Develop Department-wide strategy to address:

**5 Lines of Effort** (LOE):

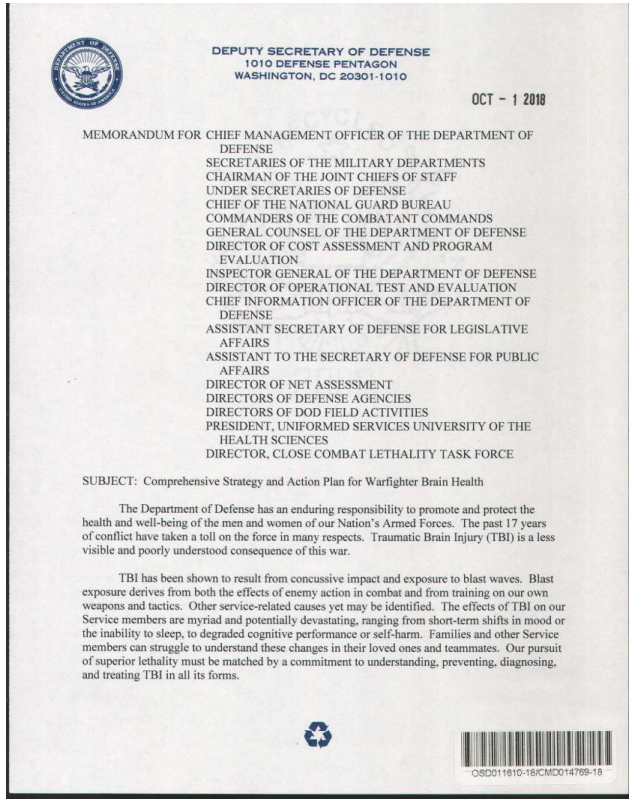
1. Optimize Warfighter Cognitive and Physical Performance

2. Identify, Monitor, and Mitigate Brain Exposures

3. Prevent, Recognize and Minimize the Effects of Traumatic Brain Injury

4. Reduce or Eliminate Long-Term/Latent Effects

5. Advance Warfighter Brain Health Science



DEPUTY SECRETARY OF DEFENSE
1010 DEFENSE PENTAGON
WASHINGTON, DC 20301-1010

OCT - 1 2018

MEMORANDUM FOR CHIEF MANAGEMENT OFFICER OF THE DEPARTMENT OF DEFENSE
SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
CHIEF OF THE NATIONAL GUARD BUREAU
COMMANDERS OF THE COMBATANT COMMANDS
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
DIRECTOR OF COST ASSESSMENT AND PROGRAM EVALUATION
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTOR OF OPERATIONAL TEST AND EVALUATION
CHIEF INFORMATION OFFICER OF THE DEPARTMENT OF DEFENSE
ASSISTANT SECRETARY OF DEFENSE FOR LEGISLATIVE AFFAIRS
ASSISTANT TO THE SECRETARY OF DEFENSE FOR PUBLIC AFFAIRS
DIRECTOR OF NET ASSESSMENT
DIRECTORS OF DEFENSE AGENCIES
DIRECTORS OF DOD FIELD ACTIVITIES
PRESIDENT, UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
DIRECTOR, CLOSE COMBAT LETHALITY TASK FORCE

SUBJECT: Comprehensive Strategy and Action Plan for Warfighter Brain Health

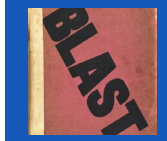
The Department of Defense has an enduring responsibility to promote and protect the health and well-being of the men and women of our Nation's Armed Forces. The past 17 years of conflict have taken a toll on the force in many respects. Traumatic Brain Injury (TBI) is a less visible and poorly understood consequence of this war.

TBI has been shown to result from concussive impact and exposure to blast waves. Blast exposure derives from both the effects of enemy action in combat and from training on our own weapons and tactics. Other service-related causes yet may be identified. The effects of TBI on our Service members are myriad and potentially devastating, ranging from short-term shifts in mood or the inability to sleep, to degraded cognitive performance or self-harm. Families and other Service members can struggle to understand these changes in their loved ones and teammates. Our pursuit of superior lethality must be matched by a commitment to understanding, preventing, diagnosing, and treating TBI in all its forms.

OSD011810-18/CMD014769-18

# Topics Covered in Section 1

- Key Terminology:
  - Blast overpressure and low-level blast (BOP and LLB)
  - BOP exposure
  - Blast injury
- Sources of BOP exposure
- BOP exposure impacts on your health, readiness, and performance




Understanding Blast Overpressure (BOP) Exposure on Health and Performance Effects

Mitigating Low-Level Blast Risks

Policies and Responsibilities


Resources You Can Use

## Learning Objectives for Section 1

- At the end of this section, you will be able to:

1. Recognize unnecessary BOP exposures and some common brain and/or physical health effects that may be from BOP exposures.

2. Distinguish and discuss the differences between general BOP and low-level blast exposures.

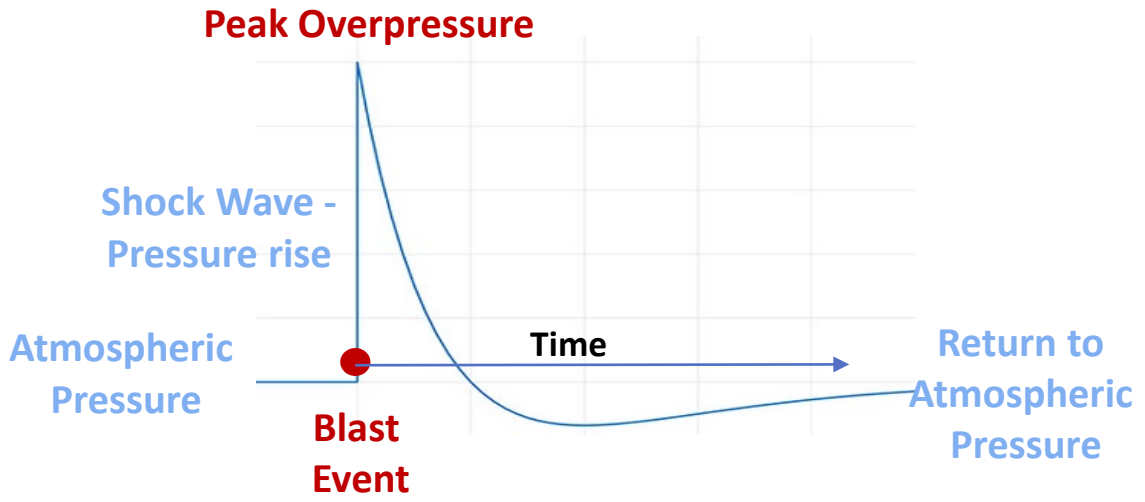
3. Name some common weapons systems and areas that pose a higher risk of BOP exposures.


Understanding Blast Overpressure (BOP) Exposure on Health and Performance Effects

# Blast Overpressure (BOP)

- The sharp rise in atmospheric pressure resulting from explosives or firing weapons is blast overpressure.
- The sharp rise in pressure is caused by a shockwave traveling faster than the speed of sound.

**Blast Pressure Change**



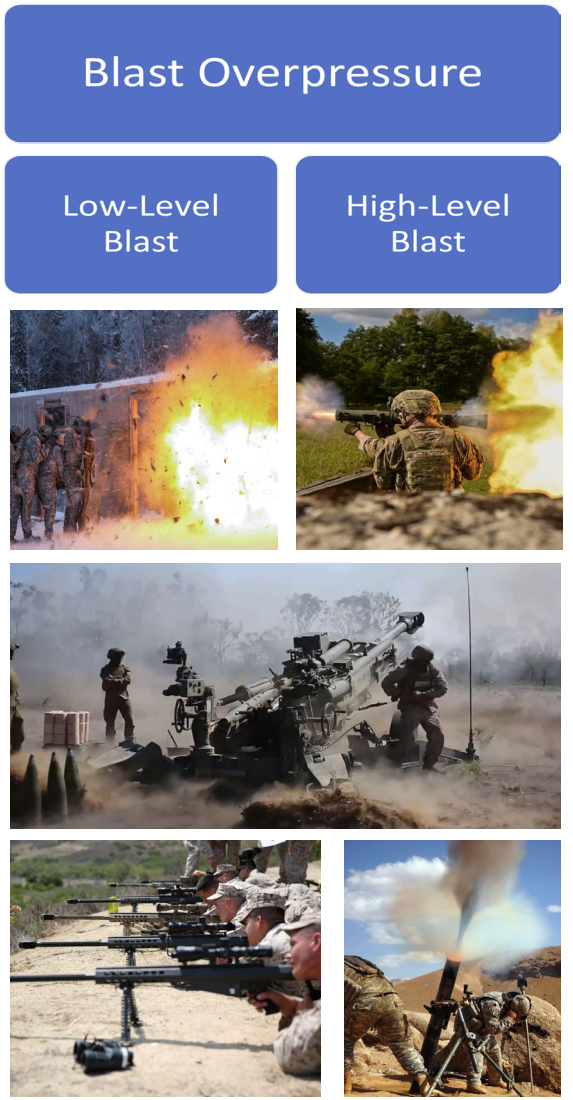
# Blast Terminology (1 of 3)

## What is Blast Exposure?

- Blast Exposure: occurs when an individual does or does not feel the shockwave generated from a blast occurrence.

Example:

- At a rock concert, if you stand near the speakers, you can 'feel the music' or the bass, which are the sound pressure waves, that is hitting (or reflecting) off of your body.
- Others cannot 'feel the music' (sound pressure waves) from far away, yet they can still hear it, as the waves can have more space to dissipate before reaching those seats.
- Like with blast pressure, the farther away you are from the source, the more time and space the waves have to dissipate/spread throughout the room. This is also why reflective surfaces or small, confined areas produce more overpressure.

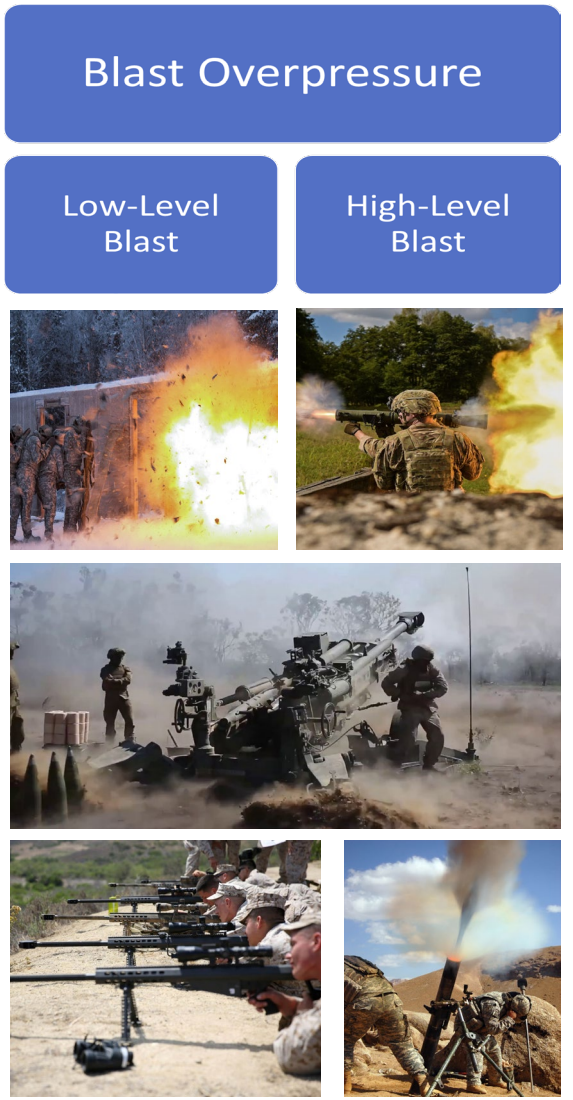


# Blast Terminology (2 of 3)

## Types of Blast Exposure

- **High-Level Blast (HLB)**: HLB exposure that mostly occurs from incoming *munitio*ns, e.g., IEDs, rocket-propelled munitions
  - But it can also be distinguished by the blast's pressure (measured in pounds-per-square-inch (psi)) that is generated, regardless of directionality.

- **Low-Level Blast (LLB)**: LLB exposure that most occurs from outgoing, user-directed firing within operational and training environments, e.g., user-directed sniper rifle
  - But it can also be distinguished by the blast's pressure (measured in psi) that is generated, regardless of directionality.



# Example Sources of LLB and HLB Exposure

## Low-Level Blast Weapon Systems *

- Shoulder-mounted weapons
- 0.50 caliber weapons
- Indirect firing systems
- Small breaching charges




## High-Level Blast Explosives

- Vehicle-borne and person-borne improvised explosive devices
- Rocket-propelled grenades


* For more, see the 'Policies and Responsibilities' with recommended stand-off distances for observers

# Blast Terminology (3 of 3)

## Blast Injury

- A blast injury occurs when the LLB or HLB exposure is close in proximity.
- A blast injury is a complex type of physical trauma resulting from direct or indirect exposure to an explosion.
- Blast injuries range from internal organ injuries, including lung and traumatic brain injury (TBI), to extremity injuries, burns, hearing, and vision injuries.





# Knowledge Check on Terminology

"What is the difference between Blast Overpressure, Low-Level Blast, and Blast Injury?"

Blast Overpressure

Low-Level Blast

Blast Injury

# Exposure Can Lead to Blast Injury and Affect Performance

- Different levels of exposures can lead to different types of injury and affect everyone differently.
- Just because you cannot see or feel it, does not mean that it cannot hurt you or others later on.

## Performance

Studies have shown that low-level blast exposure may affect:

- brain performance
- physical performance
- military career (moving occupation or disability discharge)

## Signs

Studies have shown that low-level blast exposure may result in:

- post-concussive symptoms, such as tinnitus (i.e., ringing in ears)
- general hearing difficulties, headaches, & fatigue
- cognitive changes (e.g., memory loss, attention difficulty, & mood swings)

## Documentation and Healthcare

If symptoms or signs persist & impact your daily function, you should:

- **inform your command & medical provider**

Inform your medical provider of:

- signs and symptoms you are experiencing and duration
- number & duration of general BOP exposure
- years in higher-risk occupations / unit

# Knowledge Check: BOP Exposure Amount (another scenario question)

"Some reasons why this would create more BOP or ___-___ blast exposure? Maybe more ____ , _____, …."

# Knowledge Check: BOP Exposure Amount (another scenario answer)

Some reasons why this would create more BOP or **low-level blast** exposure? More reflective surfaces, confined space, more energy of the wave, the material of the surface, …

# Knowledge Check: LLB/BOP Exposure Affects your…
# …Performance, Body, and Brain Health (1 of 2)

Being too close to a blast can have lasting health and performance effects that you _???_____ notice right away.

# Knowledge Check: LLB/BOP Exposure Affects your…
# …Performance, Body, and Brain Health (2 of 2)

Being too close to a blast can have lasting health and performance effects that you **might NOT** notice right away.

# Knowledge Check: LLB Exposure Amount (first question)

"Which of these two firing scenarios would most likely result in more LLB exposure?"

# Knowledge Check: LLB Exposure Amount

(first answer)

LLB that occurs in settings where pressure waves are reflected off surfaces (e.g., walls) and *do not have* room to dissipate quickly before reflection occurs.

Longer Duration

# Knowledge Check: LLB Exposure Amount

(second answer)

LLB that occurs in settings where pressure waves have room to dissipate before being reflected off surfaces.

Shorter Duration

# Topics Covered in Section 2

- Low-level blast mitigation strategies
- BOP exposure control methods to avoid unnecessary exposures.
  - e.g., proper Personal Protective Equipment (PPE) or change certain aspects of the trainings
- As Low as Reasonably Achievable ("ALARA")

Mitigating Low-Level Blast Risks

# Learning Objectives for Section 2

## Learning Objectives for Section 2

- At the end of this section, you will be able to:

1. List some of the best practices to minimize unnecessary BOP exposure.

2. Implement these best practices as hazard controls in different training environments with different weapons.

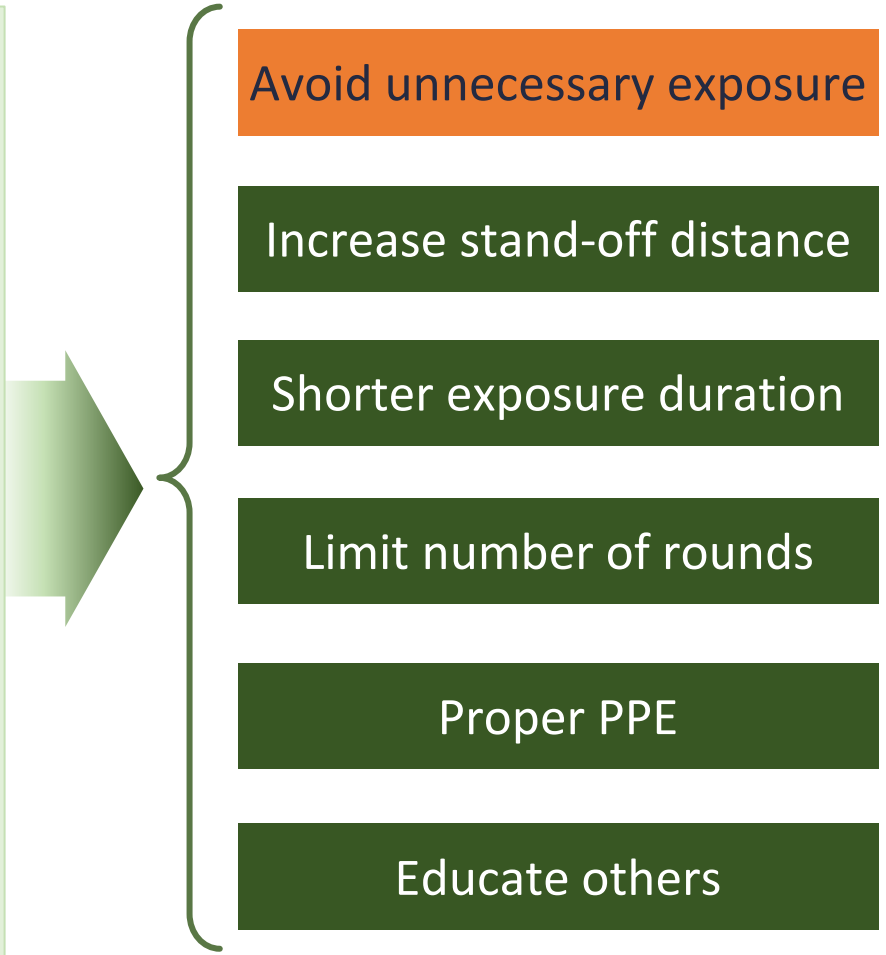
Mitigating Low-Level Blast Risks

# Interim Guidance: Raising BOP Awareness

- DoD **issued "Interim Guidance for Managing Brain Health Risk from Blast Overpressure (2022),"** known as the **"4 psi memo".**
  - **It is now rescinded as of August 8, 2024** (next section) but is still informative.
- The "4 psi memo" identifies specific actions to reduce risk but is not meant to preclude or restrict commanders from conducting mission-essential training with weapons that have been analyzed and have appropriate 4-psi data available.
- The memo is intended to raise awareness of LLB risk and advocate for an **As Low as Reasonably Achievable** ("ALARA") approach to manage exposure.

# Ways to Avoid Unnecessary BOP/LLB Exposures

1) Minimize number of personnel in vicinity of low-level blast event.
2) Increase stand-off distances from weapons for non-participating personnel.
3) Minimize the duration of live-fire events.
4) Adhere to the maximum allowable number of rounds that may be fired during each event or period.
5) Ensure appropriate use of PPE.
6) Train and educate others on low-level blast exposure hazards and risk management actions.



# Knowledge Refresher: LLB Exposure Mitigation

## How might they mitigate these LLB exposures?

Likely to have greater overall LLB exposure.

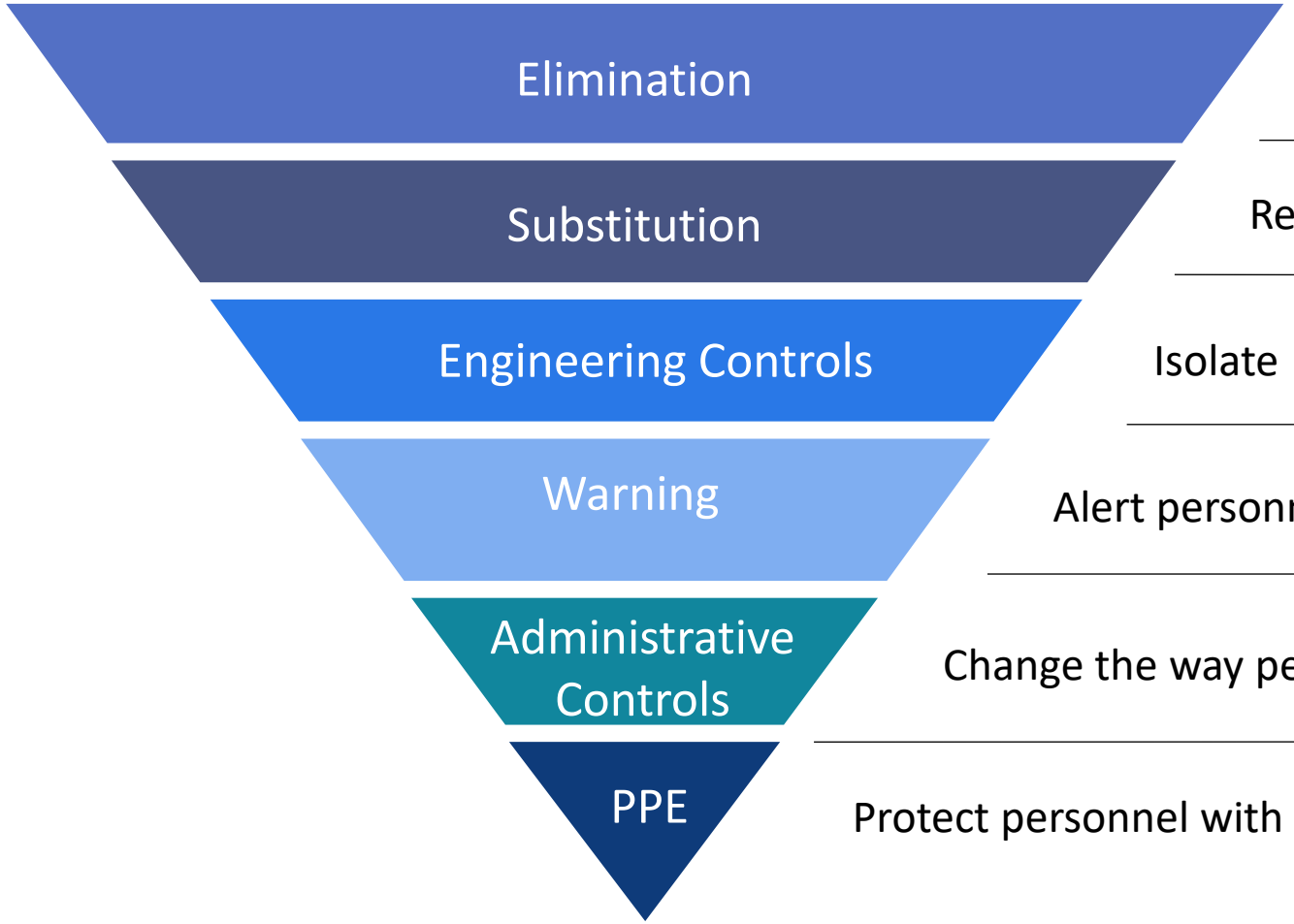
- More reflective surfaces (e.g., walls)
- Longer duration of exposure
- Higher number of exposure events
- More overpressure

Likely to have lower overall LLB exposure.

- Less reflective surfaces (only ground)
- Shorter duration of exposure
- Lower number of exposure events
- Less overpressure

# Hazard Exposure Control Areas – Best Practice

**Most Effective**




Physically remove the hazard

Replace the hazard

Isolate personnel from the hazard

Alert personnel of potential hazards

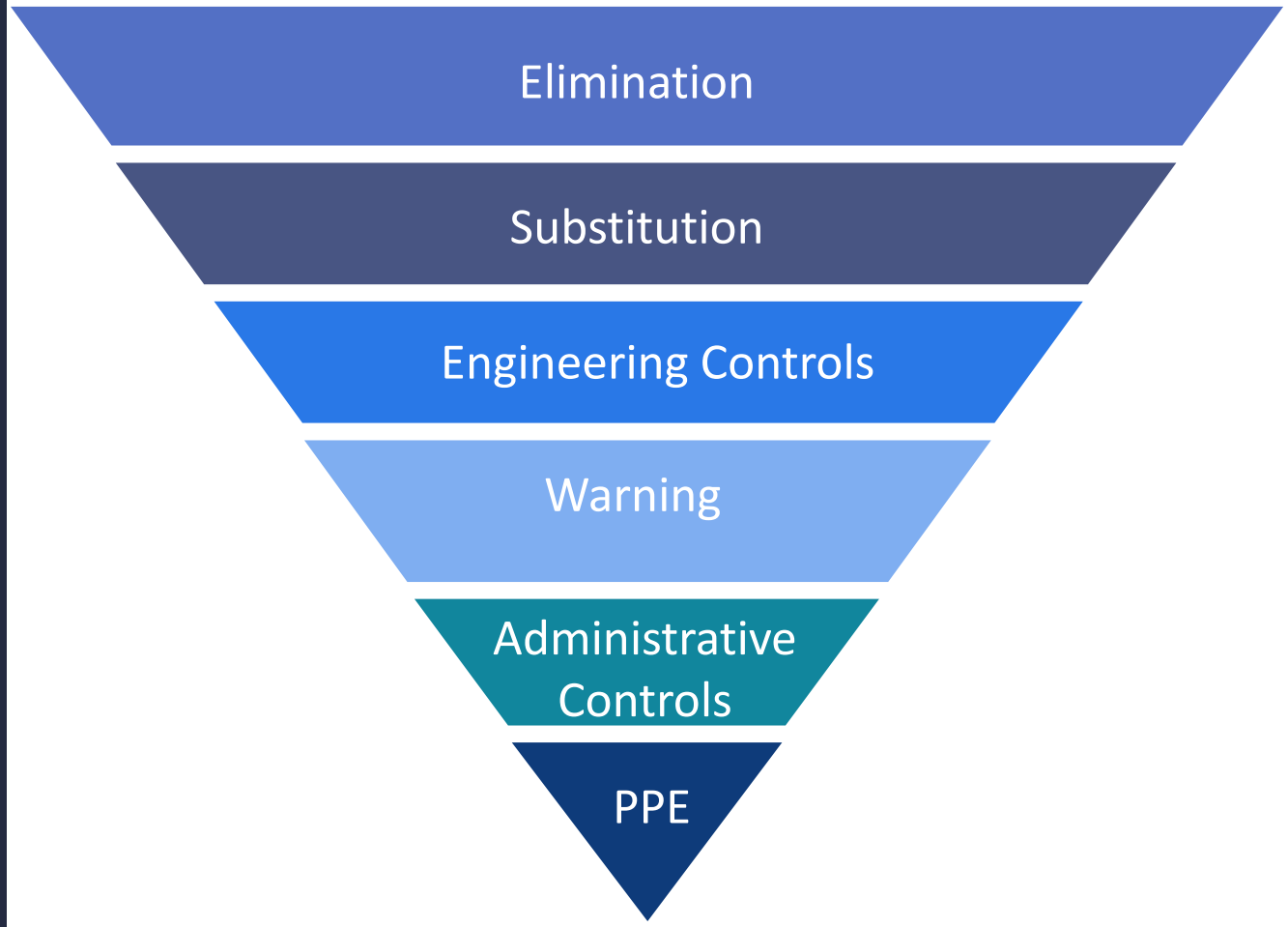
Change the way personnel perform tasks

Protect personnel with Personal Protective Equipment

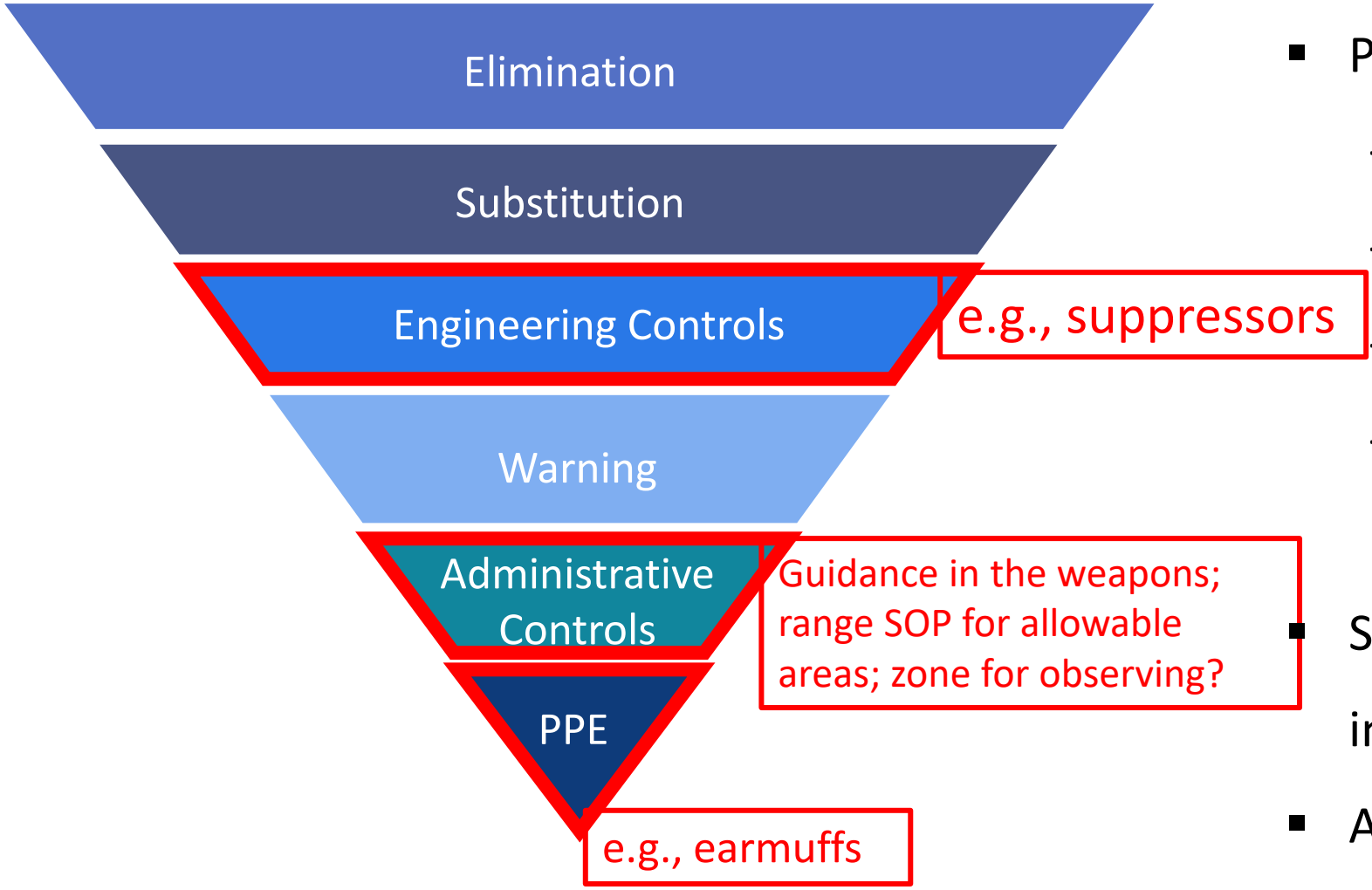
**Least Effective**

# Knowledge Check on BOP Exposure Controls

"What are some examples of the kinds of controls you could use in training to minimize BOP exposure?"



# Blast Injury Control Areas




**Additional Examples of Safety Controls**

- Proper use of PPE
  - Eye and face protection
  - Hand protection
  - Hearing protection
  - Body protection (i.e., Body armor, vests, helmets)
- Standoff distances for operators/crew, instructors, and observers
- Allowable number of rounds (ANOR)

# Topics Covered in Section 3

- Deputy Secretary of Defense Memorandum regarding BOP and requirements
- Review the responsibilities within this memorandum.
- Potentially Concussive Events and Reporting, Documenting, and Resting
- ‘Top Down’ buy in regarding reporting any signs and symptoms of unnecessary BOP exposure.




## Learning Objectives for Section 3

➢ At the end of this section, you will be able to:

1. Name the relevant requirements in the Deputy Secretary of Defense Memorandum on Brain Health Risks from BOP exposures.

2. Know where to go and document after BOP exposures, especially when there are physical symptoms.

Policies and Responsibilities

# DoD Policy and Guidance (1 of 5)

## Dep. Sec. Def. Memo. on Brain Health Risks from Blast Overpressure, Aug. 2024

- Deputy Secretary of Defense Memorandum (August 08, 2024), “Department of Defense Requirements for Managing Brain Health Risks from Blast Overpressure”
- “It sets forth DoD requirements and direction for the management of health risks to DoD personnel from exposure to BOP.”
- “This policy establishes requirements for practical risk management actions to mitigate and track BOP exposures across the DoD”.

# DoD Policy and Guidance (2 of 5)

## Dep. Sec. Def. Memo. on Brain Health Risks from Blast Overpressure, Aug. 2024

**DSD policy directs requirements to manage risks of BOP exposures, DoD Components will:**

**By Dec. 31, 2024** | Complete cognitive assessments for all Active and Reserve Component accessions as part of the entry process

**By end of FY25** | Accelerate baseline cognitive assessments for currently serving high-risk Active Duty Service members and address the remaining Active and Reserve Component Service members (exception of the IRR) as soon as possible.

- Implement procedures and standards for training and operations that incorporate BOP risk management (e.g., stand-off distances, personal protective equipment)
- Minimize the number of personnel in the vicinity of BOP generating events.
- Ensure compliance with safety warnings and restrictions in weapons systems technical and operators' manuals
- Integrate BOP risk management within the weapon system acquisition lifecycle
- Identify and track all personnel who are potentially exposed to BOP in DOEHRS-IH
- Integrate simulations into training strategies to reduce BOP exposure
- Establish procedures to ensure personnel recognize BOP symptoms, report exposures to their command, and seek an evaluation from their medical provider if experiencing symptoms.

# DoD Policy and Guidance (3 of 5)

## Dep. Sec. Def. Memo. on Brain Health Risks from Blast Overpressure, Aug. 2024

**DSD policy directs requirements to manage risks of BOP exposures, DoD Components will:**

- Establish and implement internal recordkeeping processes and procedures for BOP sensor data
- Prioritize efforts to collect BOP exposure data
- Train and educate personnel potentially exposed to BOP hazards on the potential adverse health and performance effects and risk management actions to protect themselves
- Establish procedures to track and maintain oversight of BOP exposure risk management actions, including processes to request, and provide justification in writing for, any exceptions to the policies

# DoD Policy and Guidance (4 of 5)

## Dep. Sec. Def. Memo. on Brain Health Risks from Blast Overpressure, Aug. 2024

| Common Weapons Systems Associated with BOP Exposure (Non-Exhaustive) | |
|---|---|
| | |
| **Breaching Explosives** | Door: Net Explosive Weight (NEW) of 0.23 pounds (lbs.) of Trinitrotoluene (TNT), slider - 0.30 lbs. TNT |
| | Wall: NEW of 10.0 lbs. – 14.0 lbs. |
| | |
| **Shoulder Mounted** | M3, Multi-role Anti-Armor or Anti-personnel Weapon System (MAAWS) |
| | M136, Light Anti-Tank Weapon (AT4) |
| | M72, Light Anti-Armor Weapon (LAW) |
| | |
| **0.50 Caliber Gun/Rifle** | M107, Sniper rifle |
| | M2A I, Machine gun |
| | MK 15, Sniper rifle |
| | GAU 21, Machine gun |
| | |
| **Indirect Fire Systems** | Howitzers (all platforms) – 105 mm, 155 mm |
| | Mortars (all platforms) – 120 mm, 81 mm, 60 mm |

# DoD Policy and Guidance (5 of 5)

## Dep. Sec. Def. Memo. on Brain Health Risks from Blast Overpressure, Aug. 2024

**Recommended Minimum Stand-off Distances for Characterized Weapon Systems:**
Applies to Stationary, Land-Based, Open Terrain

| Category | Weapons Systems | Minimum Standoff Distance (ft.) |
|---|---|---|
| ***Breaching Explosives*** | Water Door, Charge 0.11 lbs. N.E.W. (Exterior Breaching) | 13 |
| | | |
| [1] ***Shoulder Mounted*** | M3 Multi-role Anti-armor Anti-personnel Weapon System (MAAWS), Ammunition/Round Type: A557/84 mm HEAT TP 552 | 16 |
| | M136A1 Anti-tank 4 Confined Space (AT4CS), Ammunition/Round Type: 84 mm AT4CS-RS TP 552 | 10 |
| | M72 Light Anti-Armor Weapon (LAW), Ammunition/Round Type: 66 mm HEAT | 10 |
| | | |
| ***0.50 Caliber Gun/Rifle*** | M107 Sniper Rifle, Ammunition/Round Type: A557/0.50 BMG - M33 Ball with Propellant: WC 860 | 7 |
| | M2A1 Heavy Machine gun (Trailer-mounted), Ammunition/Round Type: 0.50 cal M8 API | 7 |
| | MK 15 Sniper Rifle, Ammunition/Round Type: 0.50 cal M33 Ball | 7 |
| | | |
| ***Indirect Fire System (Howitzers)*** | M777 155 mm, Ammunition/Round Type: 2M231 charges ("2LIMA") | [2] Measurement< 4 psi |
| | M119 105 mm, Ammunition/Round Type: M1 projectile, 105 mm HE M67 propellant system charge 6 | [2] Measurement< 4 psi |
| | | |
| [3] ***Indirect Fire Systems (Mortars)*** | M224 60 mm, Ammunition/Round Type: M1061 (B29) HE mortar cartridge, 2 propelling charges | 3 |
| | M252 81 mm, Ammunition/Round Type: M889A2 HE mortar cartridge, M223 propelling charge | 7 |
| | M120/121 120 mm, Ammunition/Round Type: M933 HE mortar cartridge, M230 propelling charge | 13 |

N.B.: See “notes” section for superscript notations

# General DoD Policy and Guidance (1 of 3)

- DoD Policy (DODI 6490.11) established policy & procedures for management of mild TBI (traumatic brain injury) in the deployed setting.

- This included the clarification of roles, responsibilities, & a standardized plan of action of a potentially concussive event.

- Policy related to implementing mitigation strategies to reduce threats to brain health and performance from LLB exposure are in development.

# General DoD Policy and Guidance (2 of 3)

- Appropriate evaluation and treatment of Service members involved in blast and potentially concussive events.
  - ✓ **DoD's focus on a "4 psi" threshold** is not intended to imply **that repetitive** exposures below 4 psi are assured to be safe.
  - ✓ The medical science continues to evolve. All should practice ALARA for this reason.
  - ✓ **Leaders should encourage screening and reporting LLB exposure** and injury events & then document these occurrences within DOEHRS/ILER. **This creates an open, buy-in culture**.

# General DoD Policy and Guidance (3 of 3)

- Recommended that Service members exposed to potentially concussive or blast overpressure events, especially those causing physical symptoms (e.g., ringing in ears, dizziness), take a rest period to prevent exacerbating potential brain injury.

  - Events that may induce these types exposures include: (but not limited to)
    - Repeated exposures to blast overpressure from own/others' weapon systems (LLB);
    - Vehicle associated with a blast event (IED), collision, or rollover;
    - Exposure in an environment that is within 50 meters (about half a football field) of a blast inside or outside;
    - Direct blow to the head.

- Applies if event happens on or off duty.
- It is suggested that an evaluation by a medical provider be done as soon as reasonably possible.
  - DoD policy: line commanders report potentially concussive & direct head trauma in 24h with a rest period.

# Leadership Responsibilities and Reporting

**LEADERSHIP RESPONSIBILITIES**


- **Recognize** potentially concussive events and potential symptoms.
- **Refer** for appropriate medical evaluation.
- **Report** all potentially concussive events.
- **Rest** requirements adhered.
- **Return to Duty** when cleared by medical personnel.

Per DoDI 6490.11, **reporting** service member exposure to Potentially Concussive Events (PCEs) is required in a deployed environment.

- The leader is required to report all service members involved in a PCE event by completing a significant activities report.
- All reports should be completed within 24 hours from the time of injury.
- PCEs are sent to Joint Trauma Analysis and Prevention of Injury in Combat Program Office monthly.

# Topics Covered in Section 4

## Know before you go…

**milSuite**: Health Hazard Assessments, Allowable Number of Rounds, Noise Hazard Contours

**TBI CoE**: Traumatic Brain Injury Center of Excellence (TBICoE)

**WBH**: Warfighter Brain Health Initiative's Hub

**D-BOP-RIG**: DoD BOP Reference and Information Guide (D-BOP-RIG)


Understanding Blast Overpressure (BOP) Exposure on Health and Performance Effects

Mitigating Low-Level Blast Risks

Policies and Responsibilities


Resources You Can Use

# Learning Objectives for Section 4

- At the end of this section, you will be able to:

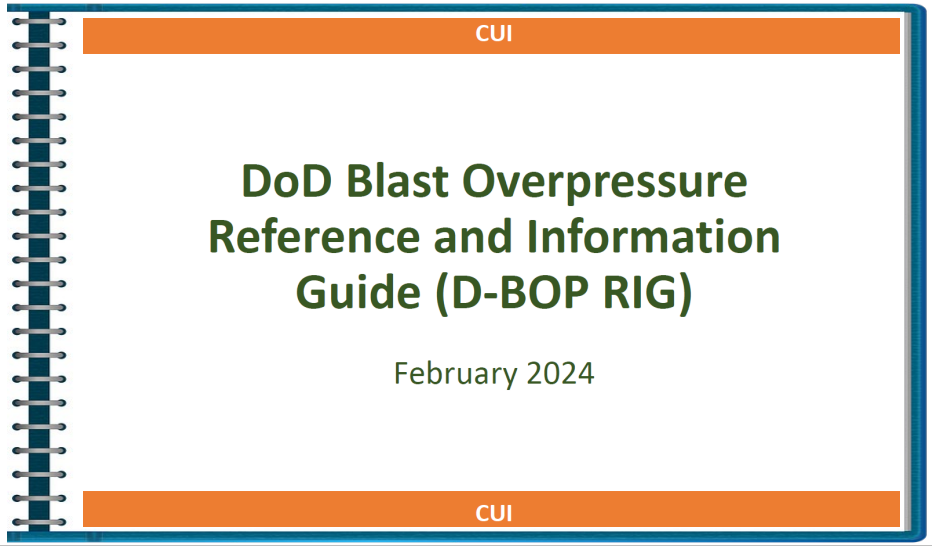
1. Successfully utilize the Department of Defense Blast Overpressure Reference and Information Guide (D-BOP-RIG)

2. Know where to find common information and tools to inform you and others about brain health and blast overpressure.

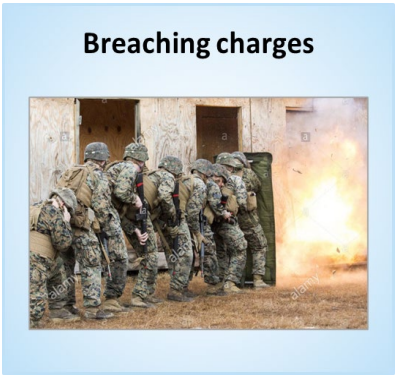

Resources you can use

# DoD Blast Overpressure Reference and Information Guide (D-BOP-RIG)

- The FY18 National Defense Authorization Act (NDAA) Sec 734 Blast Overpressure Studies (BOS) team developed a Blast Overpressure Reference and Information Guide (BOS Flipbook) as a guide to help Instructors, Range Officials, and others to understand how to apply the 4-psi threshold boundary.






# DOD Blast Overpressure Reference & Information Guide (D-BOP-RIG)

## How to use this guide

Title:
- Weapon system name and type
- Personnel position (standing/kneeling/prone)

Most relevant BOP safety information
- *Suggested standoff distance for personnel in vicinity of the stationary weapon system based off 4psi contour.* Ex: the distance is 10 feet, which, for context, is about the same distance as two M107s laid end-to-end
- *Suggested personal protective gear and equipment (PPE) level.* Protections associated with each PPE level obtained from "DA PAM 385-63 (Range Safety)," 2014.

### M107 Sniper Rifle

**PRONE**

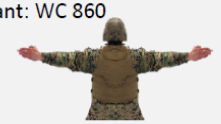
#### DoD Personal Protective Equipment Guidance

**Hearing protection** 180 ft to the side of the weapon, and 39 ft to the rear.

**Eye protection** for those on the range.

#### Data Collection Information and Recommended Stand-off Distances

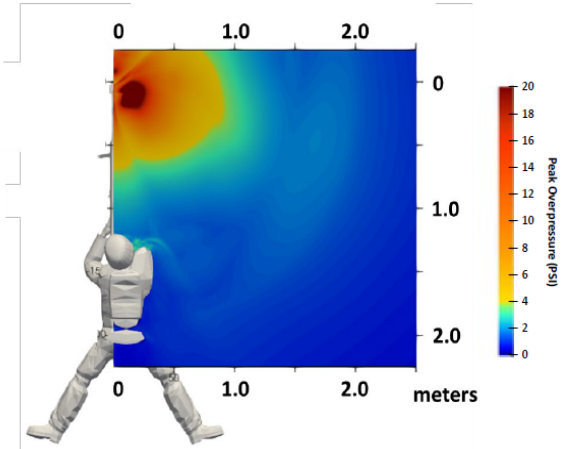
Weapons System: .50 cal blow-back operated semi-automatic sniper rifle with dual chamber detachable muzzle brake
Ammunition: DODIC: A557
Round Type: .50 BMG – M33 Ball with Propellant: WC 860
Data Collection: 10 shots
BOP Sensor: 0.3 ft above ground




Minimum Stand-off Distance:
Based on collected data, minimum distance for observers and non-essential personnel to minimize exposure to 4psi:
**7 ft or approximately 2-arms length**

#### Blast Overpressure Measurement Data

Horizontal slice at height = 0.32 m

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# Resources: Know before you go…

- Resources are readily available on the most current information to help keep you safe.
- Before going to the range, make sure you have the most up to date information to protect you and your team.
  - milSuite is a Common Access Card (CAC) enabled collection of safety information. https://www.milsuite.mil
  - It hosts the Allowable Number of Rounds (**ANOR**) and Noise Hazard Contours (**NHC**) Database for specified weapon system firing conditions.
    - **ANOR:** the **maximum number of rounds** that may be fired within a **24-hour period**. The lower the ANOR, the more hazardous the noise level.
    - **NHC:** the **minimum stand-off distance** from the noise source while wearing specified hearing protection (single or double).
  - Risks (ANOR, NHC) are determined through Defense Centers Public Health-Aberdeen (DCPH-A) evaluation of weapon systems through Health Hazard Assessment (**HHA**) and Joint Service member Occupational Health Assessments (**JSOHA**).

# Resources: Warfighter Brain Health Hub

health.mil/brain ➢ Warfighter Brain Health (WBH) Hub **brings together resources** from the Centers of Excellence.

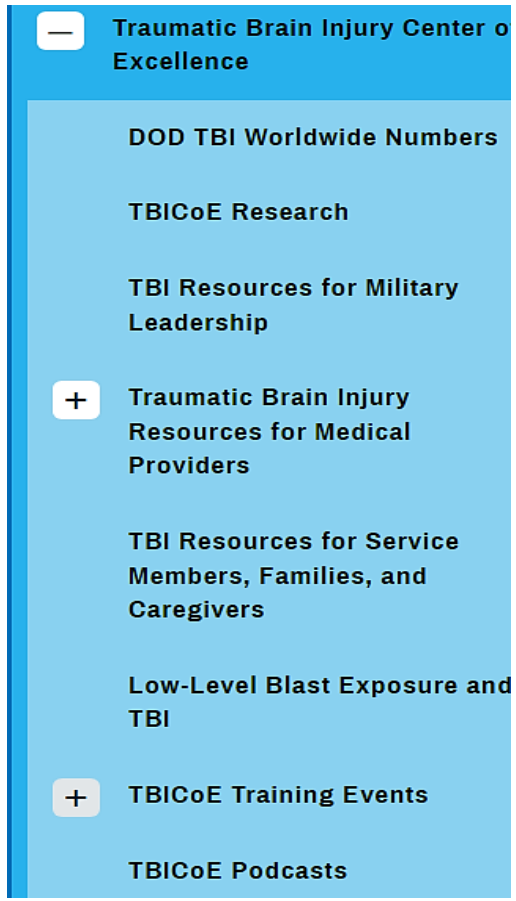

Focusing on:

- Cognitive & physical performance
- Identifying & monitoring brain exposures
- Mitigating brain exposure & TBIs
- Reducing effects of brain injury
- Advancing warfighter brain health


- Commitment to understand, prevent, diagnose, & promptly treat brain injury (BOP and TBI)

# Resources: Traumatic Brain Injury Center of Excellence (TBICoE)

**health.mil/TBICoE** ➢ Traumatic Brain Injury Center of Excellence (TBI CoE) provides **educational resources and information** for:

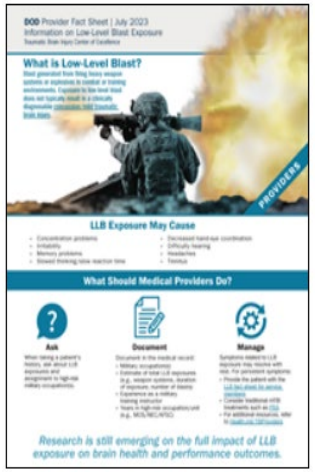



Provider Resources | Patient Resources | Resources for Military Leaders | Training and Events | TBICoE Research | TBI Numbers | TBICoE Podcasts

- Variety of resources pertaining to educational materials, 'Fact Sheets', clinical recs., & more

• TBI CoE Podcasts • LLB Video • Infographics • LLB Fact Sheets for Service members & Providers • Concussion Evaluation App

Service Member Fact Sheet | DOD Provider Fact Sheet

# Additional Resources

- Department of Defense Warfighter Brain Health Initiative – Strategy and Action Plan, June 8, 2022
- Assistant Secretary of Defense for Readiness Memorandum, “Interim Guidance for Managing Brain Health Risk from Blast Overpressure, November 4, 2022
- Deputy Secretary of Defense Memorandum, “Department of Defense Requirements for Managing Brain Health Risks from Blast Overpressure”, August 8, 2024
- Department of Defense Blast Overpressure Reference and Information Guide **https://denix.osd.mil/auth/soh/programs/bop/**
- Warfighter Brain Health Hub, **https://www.health.mil/brain**
- Department of Defense Occupational Exposure Assessment Data Collection Protocol for Blast Overpressure Hazards, **https://denix.osd.mil/auth/soh/programs/bop**
- Defense Explosives Safety Regulation 6055.09, “Defense Explosives Safety,” January 13, 2019

# Additional Information

# DVID LINKS TO EXAMPLE VIDEOS OF BOP EXPOSURES and TRAININGS

Intro. to what LLB is and how providers can help: TBI CoE vid
https://www.dvidshub.net/video/897918/tbi-and-low-level-blast-exposure-medical-providers-need-know

short video describing biology of LLB. I would insert this link (or 'add video') in the TBI CoE Resource Section
https://www.dvidshub.net/video/940284/talking-blast-exposure-impact-with-tbicoe

video showing blast exposure and hearing protection…others around a weapon system, who may not need to be there except the instructor.
https://www.dvidshub.net/video/767677/tech-warrior-participant-spotlight-cfd-research

TBI video of symptoms; these could easily apply to acute or chronic LLB exposure
https://www.dvidshub.net/video/910805/tbi-symptoms

At 0:28: onward for medic and overpressure: Do all of them need to go to the helicopter or can it be accomplished by 2 or 3? https://www.dvidshub.net/video/937469/corpsman-up-3d-medical-battalion-conducts-joint-training-with-3-25-flight-medics

# DVID LINKS TO EXAMPLE VIDEOS RELATED TO BOP/LLB EXPOSURES & TRAININGS

video showing potentially concussive event/neurotrauma but could also say this is critical when a person is experiencing physical or cognitive symptoms (e.g., confusion, balance is off, sick to stomach)
https://www.dvidshub.net/video/910807/potentially-concussive-event-happens-now

4 min video: Breaching blast. This could be used as an example and describe how one can remain safe from the blast (refer to DSD Standoff Distances table---slide in the policy section)
https://www.dvidshub.net/video/918038/b-roll-beauty-blast

short video showing clearing a buildings with high power weapon as training exercise, could use as an example of multiple reflective surfaces
https://www.dvidshub.net/video/941214/blue-october-2024-integrated-training-exercise-building-clearing-operations

at 1:00 – showing weapons training with spacing between them—one way to lower risk of LLB is to simply increase those distances between individuals, even one or two extra feet makes a big difference
https://www.dvidshub.net/video/940800/225-echo-company-fire-and-move-exercise

# DoD Policy and Guidance Bulleted/Numbered sections of the DSD memo on Blast Overpressure (for modification in text instead of pictorial version)

1. **Undergo** a **cognitive assessment** as part of entry process, so future comparisons can be performed.

2. **Implementation of risk management** requirements:
   - **Stand-off distance**s should be adhered to, when possible. Refer to the D-BOP-RIG for common weapons systems' radial distances to minimize exposure.
   - Proper **personal protective equipment (PPE)** must be worn for firers, trainers, & other personnel at an increased risk of exposures.

3. **Minimize number of personnel in the vicinity** that are not directly training or executing the task.

# DoD Policy and Guidance Bulleted/Numbered sections of the DSD memo on Blast Overpressure 1 of 3 (for modification in text instead of pictorial version)

4. **Integrate risk managem**ent of BOP in the weapons acquisition cycle & include warnings and cautions in operators' manual, warning that > 4 psi levels of BOP cannot be eliminated through design modifications.

5. **Enforce compliance** with Safety warnings and restrictions within the manuals are adhered to and are prominent.

6. **Integrate simulations into training** strategies, when appropriate. Do not expend excess rounds once training standards are achieved.

# DoD Policy and Guidance Bulleted/Numbered sections of the DSD memo on Blast Overpressure 2 of 3 (for modification in text instead of pictorial version)

7. **Identify and track** potentially exposed personnel to BOP within the data infrastructure system. Identify and track those with increased risk occupations of BOP exposure.

8. **Prioritized effort to collect BOP exposure** that adheres to DoD guidance, ensuring standardization of BOP data collection.

9. **Establish and implement internal record-keeping** processes for managing BOP sensor data.

# DoD Policy and Guidance Bulleted/Numbered sections of the DSD memo on Blast Overpressure 3 of 3 (for modification in text instead of pictorial version)

10. **Train and educate personnel** about potential health and performance effects, such as perturbing cognition, and risk management actions that they can use to protect their body**.**

11. **Establish procedures to recognize symptoms**, report exposures to their command, and seek a medical evaluation if still experiencing those symptoms.

12. **Establish procedures to track and maintain oversight** of risk management actions, in accordance with DoDI 6055.01, DoD Safety and Occupational Health (SOH) Program.

# Individual Policy Memo elements of editing purposes (1 of 2)

| | |
|---|---|
| **By Dec. 31, 2024** | Complete cognitive assessments for all Active and Reserve Component accessions as part of the entry process |
| **By end of FY25** | Accelerate baseline cognitive assessments for currently serving high-risk Active Duty Service members and address the remaining Active and Reserve Component Service members (exception of the IRR) as soon as possible. |

- Implement procedures and standards for training and operations that incorporate BOP risk management (e.g., stand-off distances, personal protective equipment)
- Minimize the number of personnel in the vicinity of BOP generating events.
- Ensure compliance with safety warnings and restrictions in weapons systems technical and operators' manuals
- Integrate BOP risk management within the weapon system acquisition lifecycle
- Identify and track all personnel who are potentially exposed to BOP in DOEHRS-IH
- Integrate simulations into training strategies to reduce BOP exposure
- Establish procedures to ensure personnel recognize BOP symptoms, report exposures to their command, and seek an evaluation from their medical provider if experiencing symptoms.

# Individual Policy Memo elements of editing purposes (2 of 2)

Establish and implement internal recordkeeping processes and procedures for BOP sensor data

Prioritize efforts to collect BOP exposure data

Train and educate personnel potentially exposed to BOP hazards on the potential adverse health and performance effects and risk management actions to protect themselves

Establish procedures to track and maintain oversight of BOP exposure risk management actions, including processes to request, and provide justification in writing for, any exceptions to the policies

# Contact Information for Questions or Feedback

NPE Mailbox for

Health Affairs—Health Readiness Policy & Oversight:

:

dha.ncr.ha-support.list.policy-hrpo-kmc-owners@health.mil