



Less Lethal Tactical Decision-Making for the Team Leader

NATIONAL TACTICAL OFFICERS ASSOCIATION

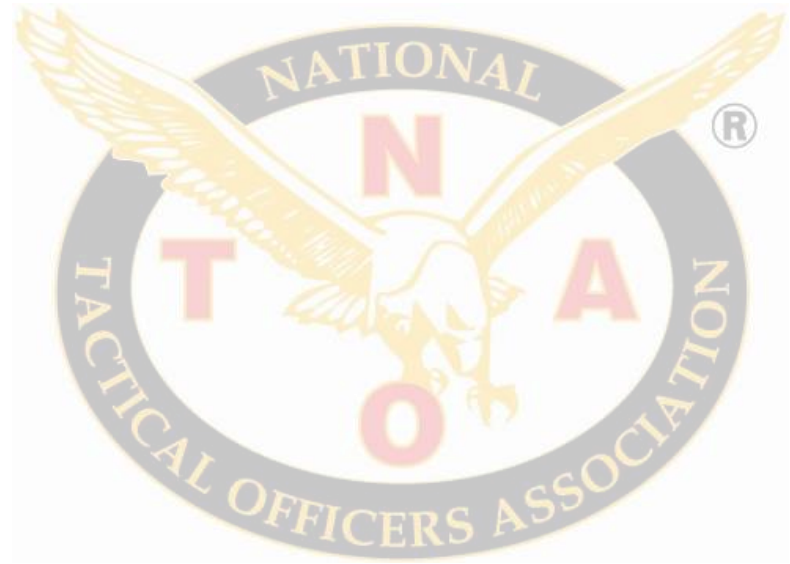
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Objectives

- Review the less lethal tactical decision-making process – philosophy, planning, tactics, and past problems.
- Review less lethal projectiles and how they work.
- Review chemical agents, use and types, and tactical considerations.
- Review flash sound diversionary devices, types, use and tactical considerations.





Section One

LESS LETHAL TACTICAL DECISION-MAKING





Considerations

- Managing officer-created jeopardy.
- Pre-incident contingency planning.
What are we likely to face? If/Then?
- Are we willing to adopt “less lethal” as a philosophy & then train and equip our officers to act accordingly?



Priorities of Life

- Hostage(s)
- Innocent Citizen(s)
- Officer(s)
- Suspect(s)



Tactical Decision-Making

Five Step Process

- Apply the “**Priorities of Life.**”
- Consider the facts and/or intelligence. Verify the facts known and the situation.
- Evaluate the environment or terrain.
- Use the appropriate police tool and/or tactic.
- Use your officer instincts.



Factors

- Situation
- Circumstances
- Suspect's Weapon(s) Available
- Crime
- Less Lethal Opportunity
- Distances



Quezada v. Bernalillo

944 F.2d 710 (10th Circuit 1991)

- “A summary of all the relevant findings reveals the district court found Deputy Sauser **placed himself in a position of great jeopardy** by standing in the open and close to Ms. Griego's car. Deputy Sauser **disregarded his own safety** by standing where he did. His actions left absolutely no room for error and forced the deadly confrontation because — given his vulnerable location — Deputy Sauser's only available option was deadly force. But for this **negligence, deadly force would not have been required.**”

- 10th Circuit Court of Appeals





Adams et al., v. City of Reinot

1998 WL 832 190 (California Court of Appeals)



Adams et al., v. City of Reinot

1998 WL 832 190 (California Court of Appeals)

- “. . .Officers have no responsibility to save person from suicide. . .”
- Doesn't mean we shouldn't try, but just not create jeopardy for yourself or others in doing so.





Allen v. Muskogee

119 F.3d 837 (10th Circuit 1997)



Allen v. Muskogee

119 F.3d 837 (10th Circuit 1997)

- “I'm not aware of any significant debate in the law enforcement or expert witness community about the fundamental principles we're talking about here. Cover is better than no cover. Communicating from a safe distance is better than not. Getting innocent people as safely out of the way as possible is desirable. Not engaging in certain actions with mentally disturbed armed people, not getting close to them is preferable.” (Plaintiff's expert)



Tactical Planning

- Everything doesn't work all of the time on everyone, every time. **If it isn't working, consider something else!**
 - Oshkosh (WI) case of less lethal resulting in death.
- Officers should put themselves in a position that allows for safe advancement as well as a safe retreat, if necessary.



Tactical Planning

Use of force situations require proper documentation.

- Case Report
- Photos
- Amount and Type of Resistance
- Safely into Custody
- Threat to Officers/Citizens
- Number of Rounds
- Injuries
- Target Area
- Notification



Tactical Planning

Document

- Crimes
- Suspect's Actions/Resisting Arrest
- Appropriately Charged Suspect
- Case Law (Barricaded Suspect Subsequent to Lawful Order)



Problem Areas (Past)

- Creating jeopardy – unreasonable actions.
(Quezada v. Bernalillo)
- Improper selection or use of mistaken round
(Transition System).
- Leaving cover after subject falls out of sight
(Tacoma case – Deploy & Assess).
- Poor reporting and documentation.





Fatal shots fired after police thought suspect was stunned in house

By VANESSA HO
and MIKE BARBER
PI REPORTERS

Officer William Lowry (Tacoma PD) killed after suspect shot with Less-lethal Batons

Erig Berg, forensics specialist, takes photographs of the Tacoma house where shooting from inside. Lowry was struck by 7.62mm bullets from a modified SL...



Tacoma police wear black tape over their badges in honor of Officer William Lowry, who was shot and killed in the line of duty.



A police detective holds rubber ammunition used to try to subdue Sap Kray, who had barricaded himself inside his wife's home.



Tactical Decision-Making

Key Elements

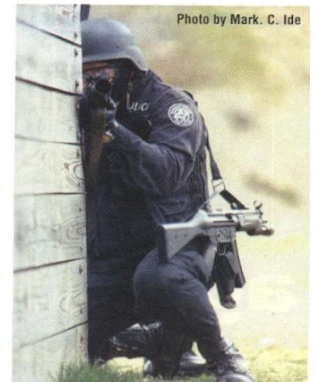
- The application of Deadly Force is sometimes necessary and appropriate.
- Tactics and training dedicated to reducing unnecessary and/or avoidable confrontation with suspects, while recognizing that situations exist where appropriate confrontation must be considered.



Tactical Decision-Making

Less Lethal Opportunity

- A set of circumstances or movement created by the suspect or officer which allows for the successful deployment of a less lethal option.
- “Take and make the shot.”



Tactical Pause

- Suspect pauses/stops actively resisting because he/she is getting physiologically and psychologically overwhelmed.
- During that pause or lull continue the verbal negotiations and tactical planning, then resume less lethal attempts, if necessary!
- **Remember – Save Lives!**



Tactical Decision-Making

Space and Time

- Containment positions, arrest teams and less lethal teams must understand the principles of Space and Time.



Tactical Decision-Making

Space and Time

Space applies to proximity of officers to suspects when sudden engagement occurs. More space, within reason, allows for more rapid neutralization of suspect with lessened immediate danger to unit members.

Time applies to the brain's ability to recognize danger and respond appropriately. Before the suspect gains a tactical advantage or tries harming officers when he gets stopped or confronted.



Officer Mindset

- Don't take a baton to a knife or a gunfight.
- Officers take increased risks because they don't want to “get in trouble.”
- Best intentions with all the wrong reasons get people hurt – noble cause.
- Projectiles are a force option. Do not expose yourself to get an “opportunity” to use them.



Crisis vs. Control

- Select Proper Round
- Know your Transition System
- Proper Lethal Cover
- Deploy and Assess. Don't "Gang Pile."
- Select Appropriate Tools and Tactics.
- Ambulance on Standby (Plan Ahead).



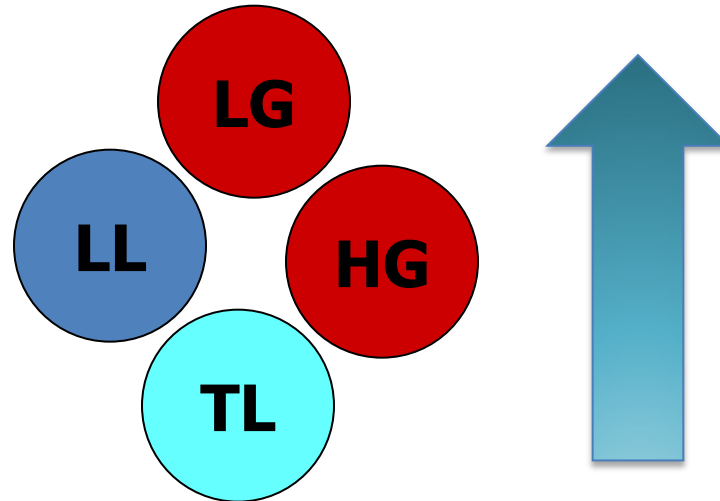
Less Lethal Tactics

- Deploy in pairs with deadly force cover.
- SWAT should function as a team for deployment.



Tactical decision-making

A Team Approach



- 360° Coverage
- Will work for non-SWAT
- Better Communication
- Specific Role Assigned
- Provides for Contingencies
- Allows for Flexibility

Tactical Decision-Making

Other Considerations

- Two less lethal deployment positions.
 - Provide additional long gun support.
 - Use two LL cover officers.
 - Verbal commands vs. control (handcuff).
 - Select alternate LL option.
 - K9 / NFDD / ERIW / OC



Tactical Decision-Making

Verbalization

- Notification of assisting units.
 - “37mm, Bean-Bag, SAGE-up”
 - Distance estimates – assist in accuracy and delivery of an effective round.



Tactical Decision-Making

Point of Aim + Point of Impact = Threat

- Most important factor for minimizing unintentional injury to subject.
 - Primary impact area – use of force model, in case where force would be necessary and appropriate.
 - Know your target area, know your system and know the threat!



“Tactical Aim Points”

- Assessment of the Situation -
”Threat”
- Less Lethal System & Munitions
- Distance from the Suspect
- Location of the Tactical Problem
- Target Area Available

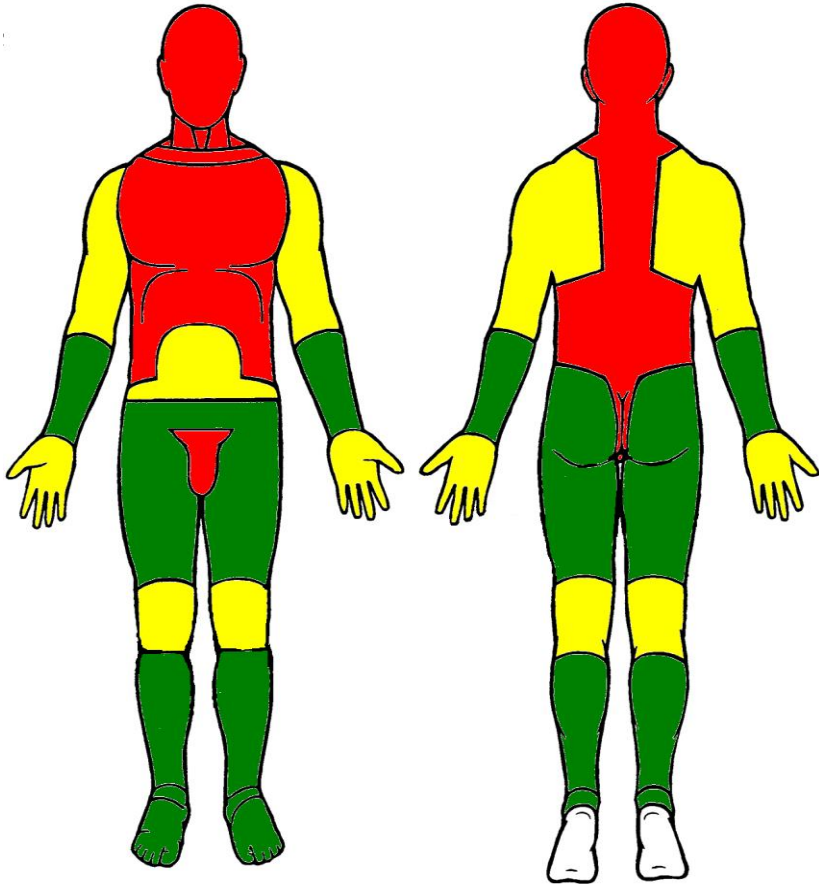


“Tactical Aim Points”

- Suspect's Size
- Suspect's Clothing
- Aim Points Available (Target)
- Replaces the Colored Target Zones



Color Chart for Injury Potential



Red Zone

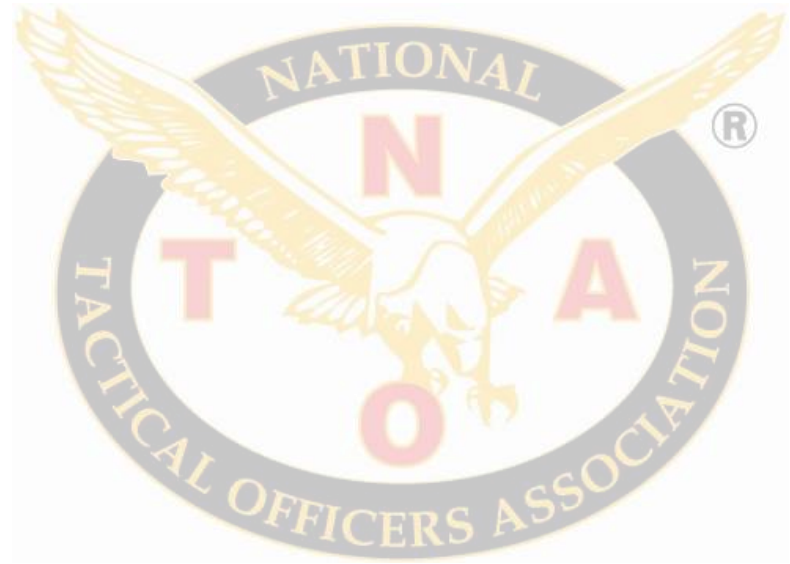
Yellow Zone

Green Zone

Know your aim points!

Where is your Less Lethal program?





Section Two

LESS LETHAL

OVERVIEW



Less lethal force is that which is less likely to result in death or serious injury, than force commonly considered deadly.

Life Saving Mission



Goal – Gain Compliance

- Less lethal projectile applications need to be scenario trained.
- On patrol – arrest teams, with lethal cover.
- On SWAT – arrest teams, entry team, containment teams.
- Deploy and Assess – Gain Compliance.



Managing Officer Jeopardy

- Training and operational philosophy dedicated towards reducing unnecessary and/or avoidable confrontations with suspects, while recognizing that many situations appropriately require confrontation!
- Understanding that Less Lethal technology is only a tool and officers should not abandon good tactics or a position of tactical advantage to use that tool.



Pre-Incident Contingency Planning

- Based on our past experiences we know we will be called to handle certain situations!
- We know we cannot control the suspects actions, but we can control our own!



Evaluating and Selecting

- Accuracy
- Effectiveness
- Potential for Causing Death or Serious Bodily Injury
- **Accuracy is the most important!**



Projectile Accuracy

- Fin Stabilized
- Spin Stabilized
- Drag Stabilized
- Aerodynamic Shape
- Velocity (Speed)



Impact Projectiles

- Blunt Trauma = Pain
- Suspect gets hit in location
...equal to the threat (aim point)
- Pain causes compliance + tactics
= increased safety for innocent
citizens, officers, and suspect.



Physiological Effects

- Specialty impact munitions are used with the intent to cause pain, and at times sufficient blunt trauma to disorient or incapacitate an individual. As such, some degree of injury is expected. This is necessary to achieve compliance or a momentary degree of incapacitation.



Penetrating Trauma

- The **unintended** and most **undesirable** outcome of an impact munition is penetration. Penetration from a SIM results from a combination of the following: excessive kinetic energy, target distance, subject's physical stature, shot placement, and clothing.



Projectile Comparisons

	Type	Weight	Velocity	K/E
1.	.22 Bullet	7.75 grains	600 f/s	108 fp/s
2.	12g. Bean Bag	40 grams	300 f/s	123 fp/s
3.	37mm (Sage)	77.5 grams	240 f/s	153 fp/s
4.	37mm Bean Bag	150 grams	230 f/s	166 fp/s
5.	Pepperball	3.2 grams	300 f/s	8-10 fp/s



Delivery Systems

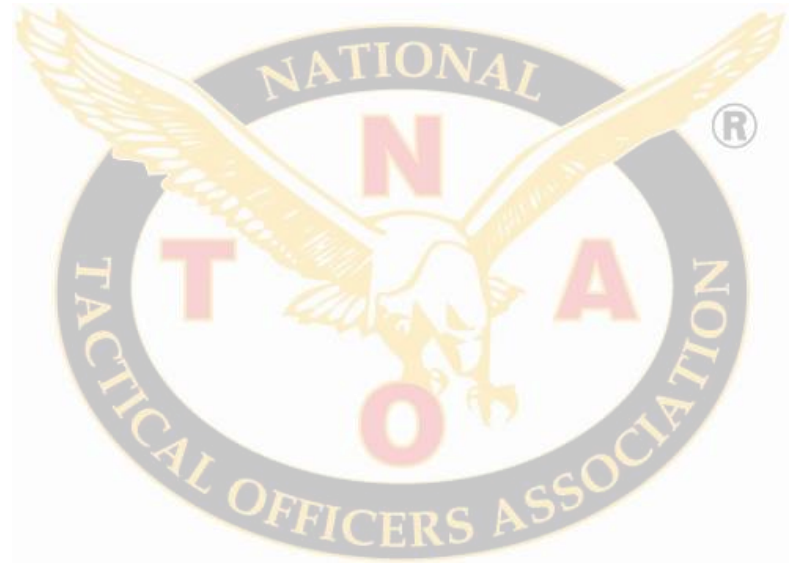
Launching

- 12 gauge – Most Common LL Platform
- 37mm Smooth Bore – “Gas Gun”
- 37mm Rifled Barrel – Sage
- 40mm Rifled – Exact Impact
- 37/40 Combination
- 68 cal. - Pepper Ball



Product Configurations





Section Three

CHEMICAL AGENTS

OVERVIEW



Current Use

Regardless of the chemical agent, current day Law Enforcement has six intended uses for CA:

- Distract
- Disorient
- Disrupt
- Disperse
- Disable
- Detect



Current Use

- Two chemical agents used predominantly today in Law Enforcement are **CS** and **OC** (oleoresin capsicum).
- All team members should be trained to properly deploy chemical agents.
- All tools have safety issues, hazards and benefits. Know them!



Deployment Considerations

- **CN/CS/OC** are generally safe and effective, if used properly, by trained personnel, in appropriate circumstances.
- In many cases, chemical agents are safer and more effective than confrontational (physical force) police tactics, including:
 - Barricaded Suspects
 - Arresting/Detaining Violent Suspects/Subjects
 - Riot control



Deployment Considerations

- Chemical agents are most effective when used in circumstances that take advantage of their unique and particular qualities.
- No one agent is perfect for every deployment scenario.
- They do not affect everyone equally.



Deployment Considerations

Lessons Learned

CN has been the causative factor in at least four deaths in enclosed space officer/suspect-subject engagements. Civil suits have been filed in such cases, with finding of officer/agency negligence for such things as:

- Exposing a barricaded subject to CN for extended periods (13 hours).
- Using an inappropriate device based on the circumstances (continuous burn indoors).
- No gas masks brought to the scene of the deployment (Titcomb v. New York State).



Indoor Deployment Tactics

Things to Consider

- Entry/Exit Point
- Power/Gas
- Water
- Bathroom Locations
- Hazardous Material (garage)
- Suspect Location
- Weapons Location
- Medical Conditions/ Medication
- Access to Gas Mask/ Prior Experience
- Age



Deployment Issues

Post Operations

- Photograph all damage.
- Photograph all munitions in place.
- Collect all spent munitions.
- Inventory all used munitions.
- Have suspects exposed to chemicals medically cleared.
- Post deployment notice – type and clean up



Documentation

- What was used?
- What order?
- Who deployed the munitions?
- Effectiveness of chemicals and deployment method.
- Injuries sustained.



Documentation

Your report must cover use of force.

- Circumstances
- Suspects Actions
- Your Response & Verbal Commands
- Identification
- “Clean-up”
- Decontamination Efforts



Administrative Issues

Have a policy and SOP!

- Who can deploy chemical agents?
- What chemical agent is authorized?
- Training required to be user certified.
- When can chemical agents be deployed?
- Storage protocols.
- Decontamination issues.



Chemical Agent Types

- CN
- CS
- OC



CS

Orthochlorobenzalmalononitrile

- International color code is BLUE.
- Primary chemical munition used by Law Enforcement in U.S.
- Peppery odor in small quantities. Classified as an Irritant. Fast acting irritant (3-7 seconds in many cases, 20-60 seconds in others).



OC

Oleoresin Capsicum

- Color code is ORANGE.
- No odor.
- Chemical Classification is Inflammatory.
- Powerful inflammatory agent occurring naturally in the cayenne pepper plant.



OC

Oleoresin Capsicum

- Dilation of capillaries and swelling of the eye lids.
- Severe twitching or spasmodic contraction of eyelids.
- Involuntary closure and extreme eye burn.
- Eyes appear red for approximately 30-60 minutes.
- Inflammatory agent that inflames tissue, as opposed to an irritant/lacrimator such as CN/CS.



Smoke

- Color code is **YELLOW**.
- Military Smoke.
- SAF-SMOKE non-toxic.
- 30 times more toxic than CS.
- One particle of smoke is 10 times larger than a particle of chemical agent.
- Will replace oxygen.



Smoke

- Physiological Effects
 - Irritation to the eyes and respiratory system.
 - Dizziness and sensory deprivation.
 - May cause chlorine pneumonia and death.
 - Responsible for more deaths in the US than other chemical agents.



Smoke

- Used as obscurant for tactical movement.
- Used to carry other chemicals.
 - Verify wind conditions.
- Comes in variety of colors.



Concepts for Deployment

- There are two main concepts for the deployment of chemical agents:
 - Direct Application
 - Space Deprivation

Both are accomplished by proper dissemination.



Dissemination

The following are the 7 ways in which to disseminate chemical agents:

1. Pyrotechnic Combustion – “Hot Gas”
2. Blast Dispersion – Muzzle Blast
3. Expulsion
4. Liquid Projectile
5. Powder Projectile
6. Liquid Aerosol – Handheld or “Devastator”
7. Fog



Dissemination

- Pyrotechnic Combustion – “Hot Gas”
 - The solid chemical is mixed with other ingredients that burn and carry the chemical in a smoke. Should be considered for indoor use only when deadly force and permanent contamination of the structure is acceptable.



Delivery Methods

- There are three main delivery methods:
 - Hand Delivery (Grenades)
 - Launcher Deployment (12ga., 37mm, 40mm)
 - Launching Cup



Dissemination



Dissemination

Powder and Liquid Projectiles



The projectiles look the same but are marked as liquid or powder.

Decontamination

Structures

- Patient work is required to decontaminate a building saturated with chemical agents. The use of a reliable commercial cleaning company, experienced with such products, should be considered in severe cases.
- Work pre-event with local professional experts and seek advice on special cleanup recommendations.
- Check with Risk Management, post use (specifically what used and/or material data safety sheet) on building and advise the owner.
- Be reasonable and appropriate on use of force.



Decontamination

Persons

- Remove person from the source of contamination.
- Stand them in fresh air for 3-5 minutes.
- Remove contaminated clothes, air them out, then wash separately or dry clean.
- Shower using cool or lukewarm running water with open drain. Do not take bath. Use only mild soap, which removes skin oil and dirt likely to trap chemical particles. No harsh scrubbing or rubbing. Chemical agents + water + flesh = potential burns. No salves.



Indoor Deployment Tactics

Delivery Concepts

- Systematic Gas Out (SGO)
 - Room by room, floor by floor, creating space denial and flushing the subject out. Designed for barricade subjects WITHOUT hostages.
- Total Gas Out (TGO)
 - Deploying chemical munitions into multiple openings simultaneously.

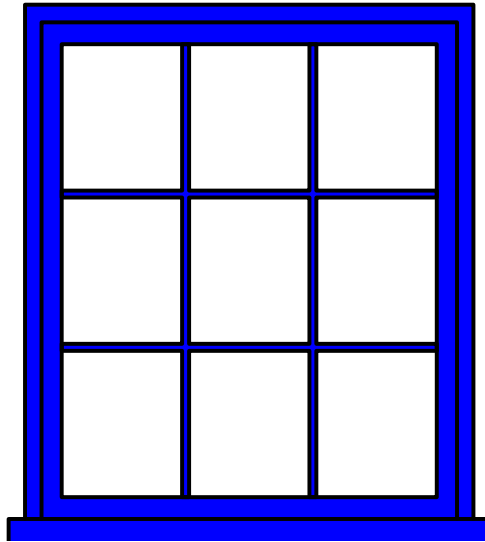


Indoor Deployment Tactics

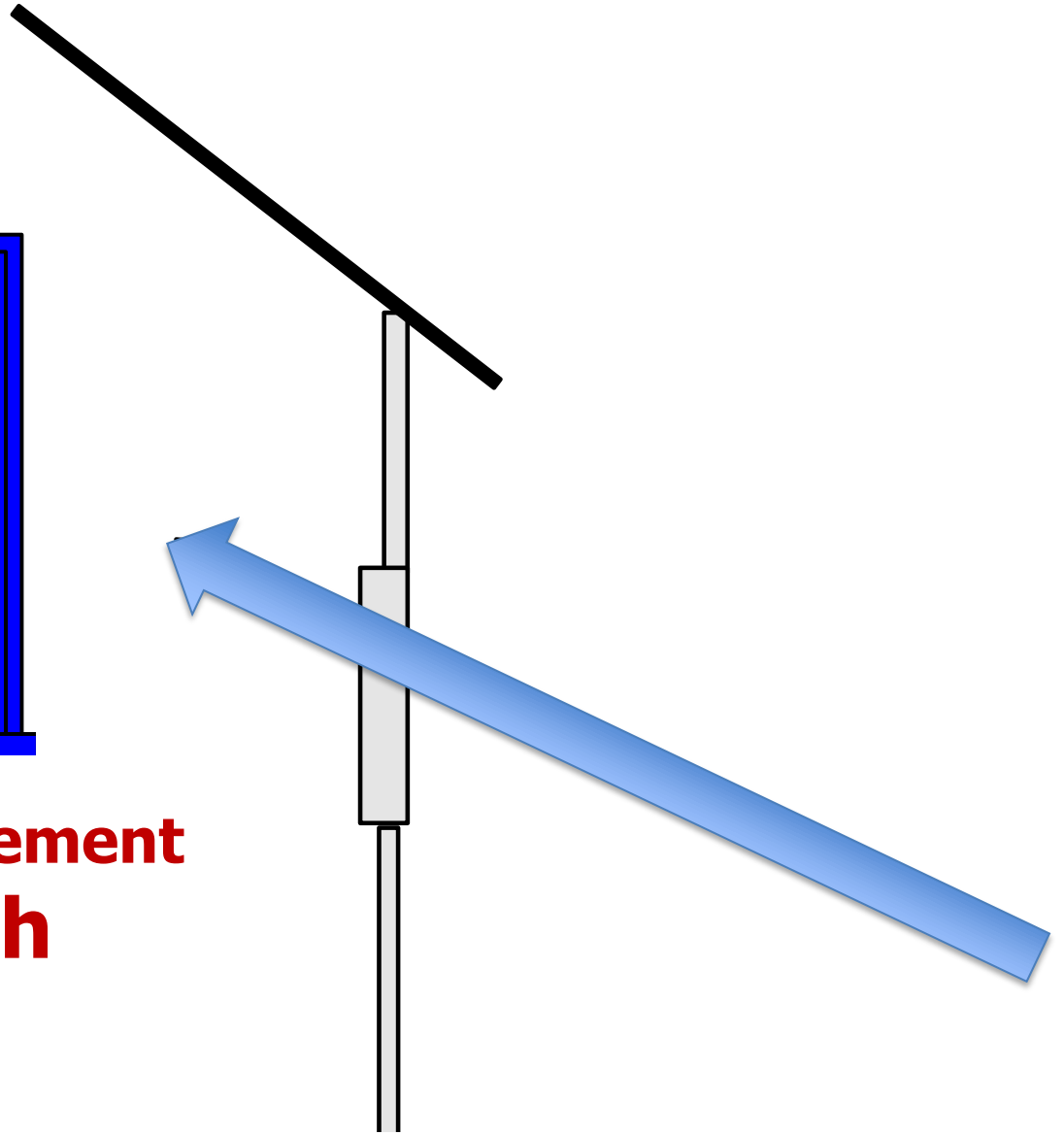
Delivery

- How many munitions? Based on seriousness of the crime, amount & type of resistance, threat to citizens/officers, floor plan etc.
- What order? (Top to Bottom/Back to Front)
- Establish time for reintroduction.
 - 5-15 minutes +/-.
 - Do not compromise officer safety by premature entry.
 - What is your goal?





Window Shot Placement Low to High



Indoor Deployment Tactics

Considerations

- Two rounds per window/door.
- Trajectory low to high. Impact upper 6” of the opening.
 - Reduced ventilation.
 - Suspects normally not located that high in window.
- Vehicle windows
 - Use side windows.
 - Front/rear are angled and may deflect.



Indoor Deployment Tactics

Considerations (Prior to Firing)

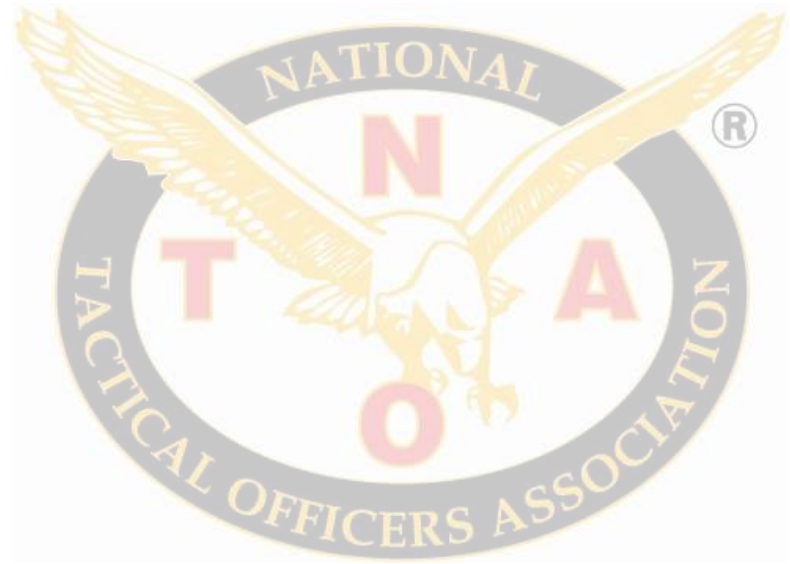
- Cover and Concealment
- Distance
- Trajectory
- Target Material/Obstructions
- Proper Munitions (not expired)
- Secondary Targets



Chemical Agent Masks

- Chemical agent protective masks are mandatory equipment for all personnel at the scene of an event where chemical agents will be deployed.
- There are a variety of masks available on the commercial/civilian, and military/police markets.
- A good working knowledge of masks is important for the whole team. Mission success or failure could depend on them.





Section Four

FLASH SOUND DIVERSIONARY DEVICES OVERVIEW



Flash Sound Diversionary Device

- A device creating a bright flash and loud report designed to temporarily divert attention of persons in the immediate vicinity, giving tactical teams a window of opportunity to exploit to their advantage.



Criteria for FSDD Use

Generally when a less lethal diversion is necessary to enable an entry/arrest team to make entry and gain control of a suspect.

- Barricade or hostage situation
- High-risk warrant service
- Apprehension of unarmed felony/violent mental subject
- Potential life threatening situations
- Other situations where the use may increase chance of safe resolution
- Diversionary devices help prevent shootings



FSDD Usage

- Overuse of FSDD's
 - Court scrutiny and legal opinions.
 - Courts may limit use in the future and require special warrant or all together eliminate the use of them.



FSDD Usage

- Overuse of FSDD's
 - “Enter no room without a boom”
 - 1 team using 12 cases of FSDD's in a few months?
 - Don't let it become policy, operator should have the option, but don't make it a standard SOP to deploy them everywhere.
 - Be prepared to describe the necessity to use.



FSDD Case Law

- The use of FSDD is closely scrutinized by the Courts.
- Some jurisdictions have suppressed evidence after use of FSDD, because of excessive force claims.
- Civil litigation concerning the use of FSDD always exists.



Motion to Suppress

- Motion to suppress is often made after the use of FSDD under two legal theories:
 - FSDD effects made confession or admission involuntary (5th Amendment)
 - Use of FSDD was excessive force (4th Amendment)



FSDD Storage

- Must be stored in appropriate magazines
- ATF Ruling 2012 – 4 issued July 24, 2012



FSDD Storage

- Definitions
 - **Explosive Actuated Tactical Devices (EATD)**
Munitions that have a mechanical M201A1 (or similar) fuze assembly, such as flash powder grenades, smoke and other tactical devices containing an explosive/ pyrotechnic compound.
 - Most of these devices, specifically stingball-type grenades, contain small amounts of flash powder or other pyrotechnic material which are regulated by ATF.



In Vehicles

- If stored in official response vehicle:
 - No more than 2 devices
 - Additional security feature: alarm, steering wheel locks, tracking device, etc...
 - SWAT Van – no more than 10 devices



FSDD Storage

- Magazine must be inspected every seven days.
 - This inspection need not be an inventory, but must be sufficient to determine whether there has been any unauthorized entry or attempted entry into the magazine or unauthorized removal of the contents of the magazine.



FSDD Storage

- Magazines must meet all construction and housekeeping requirements of 27 CFR 555



FSDD Storage

- Daily Summary
 - Agencies storing EATDs within official response vehicles must maintain a daily summary of magazine transactions (inventory storage record).
 - The record must contain the name of the explosive material's manufacturer, the quantity on hand and the dates that the materials are received, removed and used. Officers must maintain a copy of this record within the vehicle and at an off-site location, such as with their supervisor.



FSDD Storage

- Annual Inventory
 - Agencies must conduct an annual inventory of the EATDs stored in their official response vehicle and compare it to the inventory storage record.



Types of Diversions

- **“Deceptive”** – Requires a subject to form a false conclusion. (trickery)
- **“Physiological”** – Affects the normal functioning of the body by directly affecting one or more of the five senses. A FSDD falls into this category.



Physiological Diversion

- Physiological diversions assist in distracting a suspect's attention and preventing him from organized resistance.
- It creates sensory overload with light, noise, and air pressure.
- It is faster and more certain, because it works on the suspect directly and does not require an inference.



Lag Time

- We can reduce lag time through training.
- Immediate Action Drills – Any action, technique, or procedure, which is initiated by an event rather than a signal. These drills (i.e., Officer Down, Ambush, etc.) require many rehearsals to build automaticity.



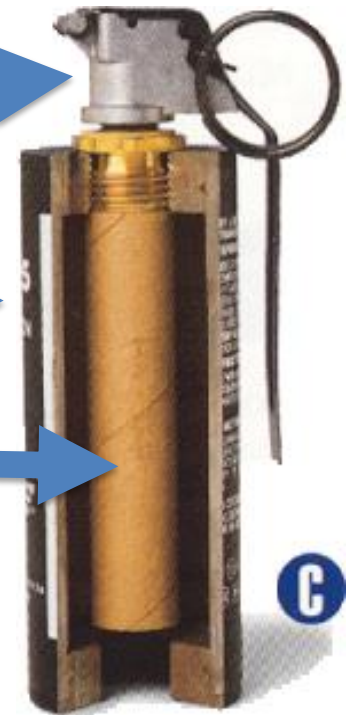
Types of Chemical Explosions

- High explosive – Usually initiated by a booster charge (blasting cap) and spread by shock wave. Velocities well above the speed of sound. Has “brisance” effect. Term - **Detonation**.
- Low explosives – Initiated and spread by combustion (burning) and needs oxygen. Velocities near or below the speed of sound. Has “heaving” effect. Term - **Deflagration**. A FSDD fall into this category.



Nomenclature and Function

- All FSDDs have three components:
 - Bouchon (Fuze)
 - Body (Canister)
 - Charge (Explosive Mixture)



Fuse vs. Fuze

- **FUSE** – A pyrotechnic device which serves as the initiator to an explosive charge (M-3A1, friction type fuse).
- **FUZE** – A mechanical device used as the initiator to an explosive charge.
 - Most common fuze is the M201(A1)
 - Delay is 1.5 seconds (Mil. Spec. .7 to 2 seconds)



Bouchon

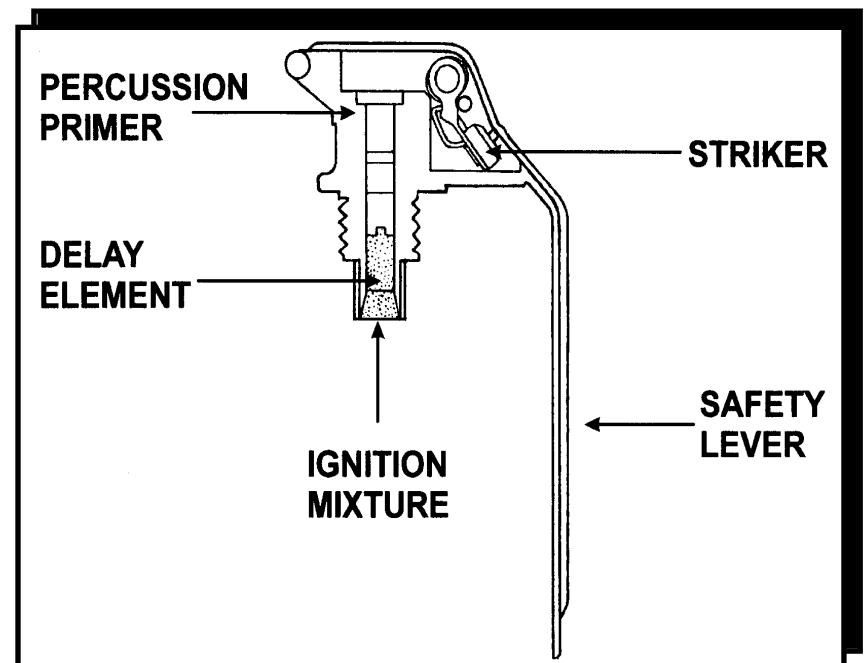
1. Safety Lever
2. Striker
3. Primer
4. Delay Element
5. Ignition Mixture



Bouchon

Fuze Head Assembly

1. Safety Lever
2. Striker
3. Primer
4. Delay Element
5. Ignition Mixture



FSDD Operation

- FSDD operation is broken into three parts:
 - Deployment Sequence
 - Firing Sequence
 - Ignition Sequence



FSDD Placement

- The proximity of the FSDD to the suspect when it ignites has great impact on the effectiveness.
 - As the distance from a FSDD is doubled, the effects from the sound level and pressure wave is halved.
 - This means that a FSDD that measures 170 dB at 5 feet will only be 164 dB at 10 feet and only 158 dB at 20 feet.
 - Ideal distance is five feet from a suspect facing the FSDD.
 - However, sighted delivery or controlled delivery is more important than proximity to suspect



Deployment Methods

- Hand Deployment – Sighted
- Bang Pole – Controlled and Sighted
- Command Initiated – Prepositioned
- Launched by 12 Gauge/Others



Hand Deployment Tactics

- Have EYES, EARS, and Nomex GLOVES for all deployments (even training). Safety!
- Have a FSDD prepared prior to entry.
 - Safety pin awareness.
 - Not needed with some types of pins.
- **Look prior to throwing FSDD. You must know target area in order to avoid risk factors.**



Hand Deployment Tactics

- Officer Down - possible exception.
- Try to let team know of deployment prior to tossing FSDD. “Bang, bang, bang”
- Don’t “milk” the spoon - Gripping and re-gripping the device while holding it with the pin removed.



Hand Deployment Tactics

You may pull pin and then decide *not* to throw FSDD. Be prepared!

- Keep pin on finger.
- Do not let go of spoon.
- Announce that you are “out”.
- Leave the area.
- Hold straight up and down and away from body.
- Do not try to re-insert pin alone. Consider the situation.
- ***If can not get pin in, go to safe area and deploy FSDD. Let others know what you are doing.***



Bang Pole Deployment

- Often used to put through or near a window
- Second or third story deployments
- Great for patios etc.
- Excellent way to control deployment and perhaps utilize cover



Tactics

- What's the mission?
- Often deployed outside of residence while entry being made. (Usually Opposite Side – Diversion)
- Often deployed at point of entry, **sighted delivery**, arc of doorway! (Goal – Disorientation of the Suspect)
- Safe sighted area, step through flash & smoke, suspect usually looking at breach point.



Tactics

- If an interior door is closed and no response received, consider deploying FSDD.
- Consider deployment at stairs, hallways and basements.
- Remember the lag time created won't last long.
- However, the loud report and smoke may have a psychological effect on the suspect.



Tactics

- FSDD normally works well on dogs.
- Consider deployment to evacuate or regain tactical advantage or for interior movement if an officer is pinned down.
- **Let the situation dictate the tactics.**
- As a Team Leader & Operator, you should know your team's philosophy on FSDD.



Potential Hazards

Children

- Otherwise minor injuries can be aggravated in young children.
- Often only real victims. Long-term emotional issues can arise.

Elderly

- FSDD will increase heart rate and may cause ringing in the ears.
- May aggravate existing medical conditions.



Potential Hazards

- **FIRE!** – FSDD's ignite at approximately 3000° C.
- Primary (launching bodies) and secondary (i.e., gravel, toys, etc.) missiles.
- Limited Visibility (smoke).
- Failure to Ignite.
- Contact Injury.



Failure to Initiate

- **End-User Error – Did Not Pull the Pin! (most common)**
- Mechanical Reasons
- Moisture
- Prolonged Exposure
- Failure Somewhere in the Explosive Train (process)
- Follow Render Safe Procedures



Documentation

- Document facts and circumstances.
- Document any injuries.
- Take photographs of scene where injuries occurred.
- Take photos of injuries.



Questions?

