# Insensitive Munition Solutions for Anti-Structure Munition Grenade

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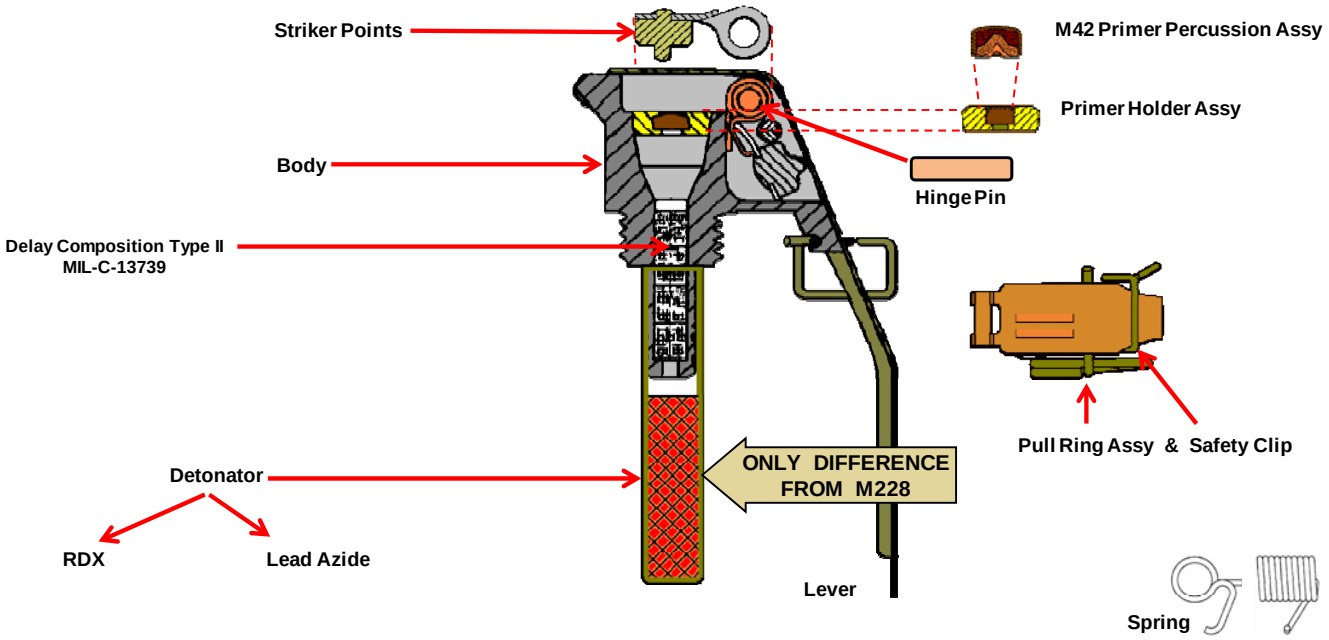
# Grenades


M67 and ASM Grenades

# M213 HE Hand Grenade Fuze



# IM Test Results

- The current design fails all IM tests. This is primarily due to the sensitive energetics in the M213 Fuze (C70 Detonator).

| IM Test Summary For M67 Hand Grenade | | | | | | | |
|---|---|---|---|---|---|---|---|
| Component | H/C | FCO | SCO | BI | FI | SD | SCJ |
| M67 | 1.1 | I | I | I | I | I | (F) |
| * Reactions shown in Parenthesis ( ) are assessed, not based on actual test scores | | | | | | | |

Type VI: No Reaction
Type V: Burn
Type IV: Deflagration
Type III: Explosion
Type II: Partial Detonation
Type: I Detonation

FCO: Fast Cook-off
SCO: Slow Cook-off
BI: Bullet Impact
FI: Fragment Impact
SD: Sympathetic Detonation
SCJ: Shaped Charge Jet

# How to Solve the Problem

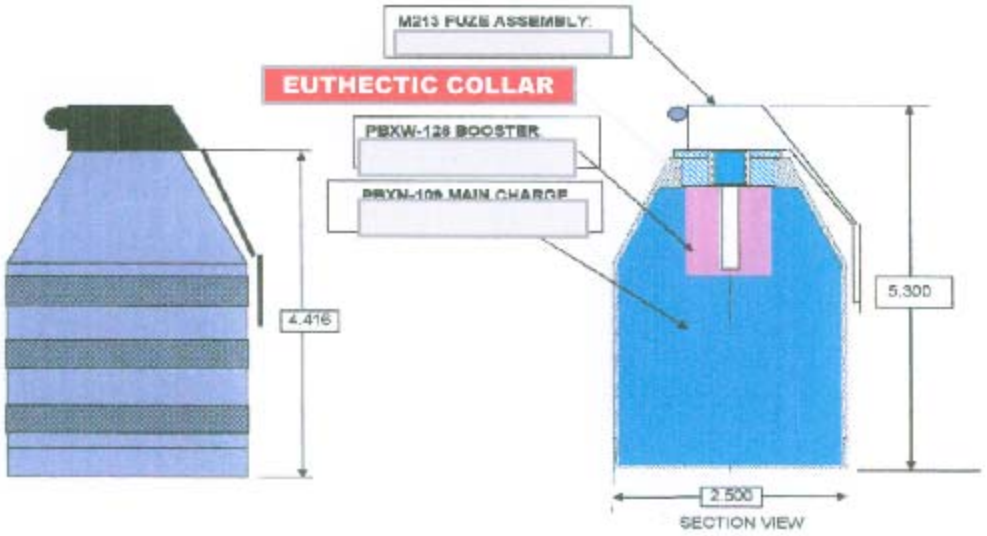
- Remove the fuze during SCO and FCO by replacing the fuze adapter with a eutectic metal that melts at about 240º F. Let the pressure from the burning PBXN-109 push the fuze out.

- This technique can be used for both the M67 and the ASM Grenade.

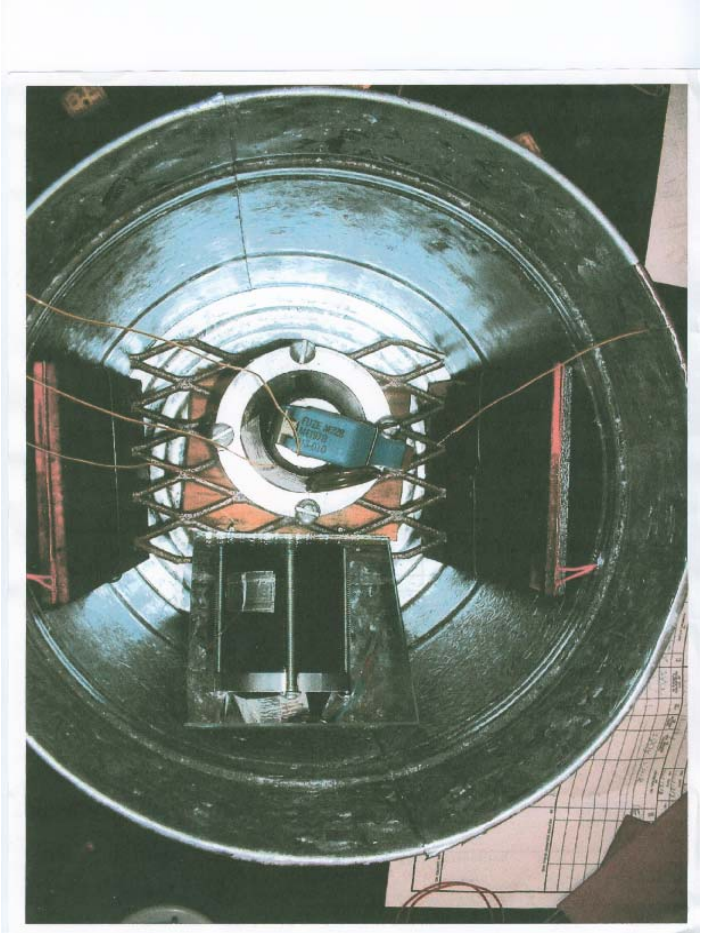
- The Comp B fill for the M67 Grenade must be replaced by an insensitive explosive such as PBXN-109, which burns rather than explode (as the ASM Grenade).

- Replace C70 Detonator in the fuze with a secondary explosive, i.e., PBXN-5. Secondary explosives burn rather than explode.

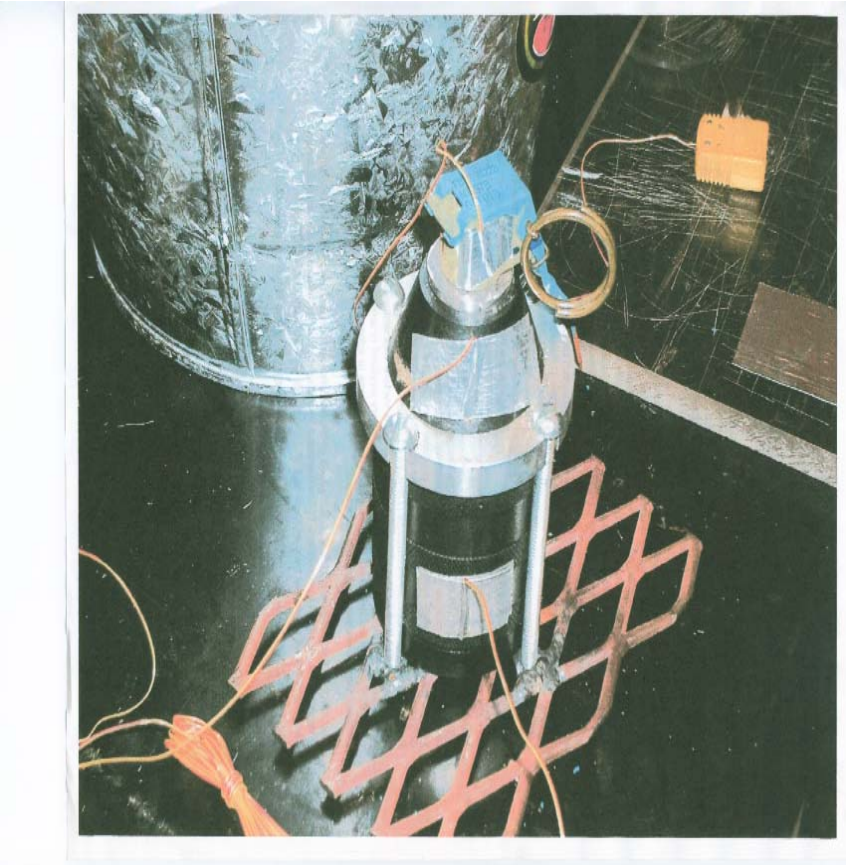
# ASM Grenade


M213 FUZE ASSEMBLY
EUTHECTIC COLLAR
PBXW-128 BOOSTER
PBXN-109 MAIN CHARGE
4.416
5.300
2.500
SECTION VIEW

# ASM Grenade, Slow Cook Off Test with M228 Fuze



ASM GRENADE SCO Test
M228 Fuze



ASM GRENADE SCO M228
Fuze Test Set Up

# Post SCO Test, ASM Grenade M228 Fuze

# Slow Cook Off ASM Grenade M228 Fuze

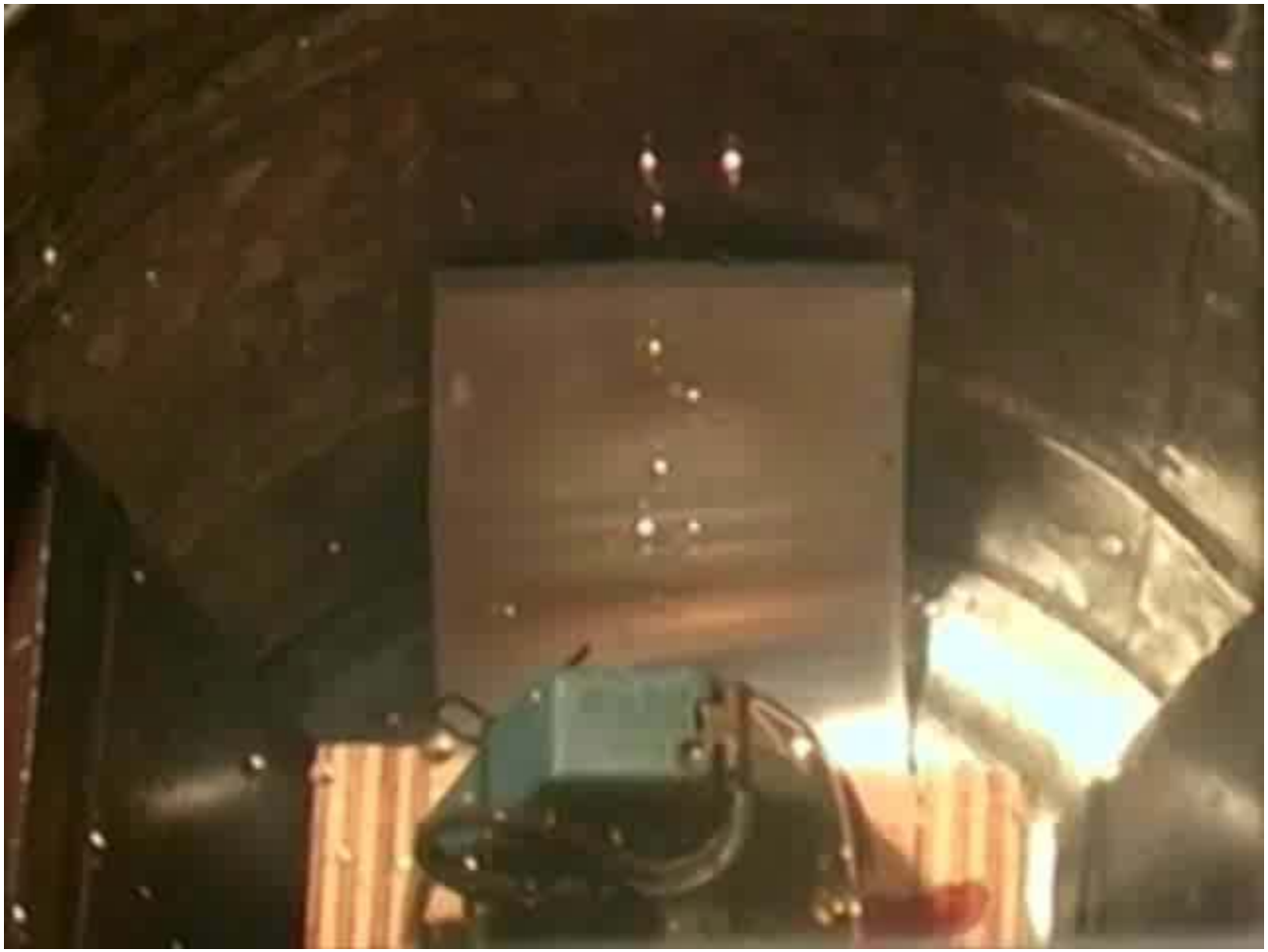
Event Video

# M67 Hand Grenade

## Introduction

- M67 Hand Grenade not IM compatible
- Contains large quantities of lead based materials (primary explosives)
- Single Point Failure

# M67 Slow Cook Off Test
# M228 Fuze



Event Video

# SCO Test ASM Grenade, M213 Fuze
## Post Test Fuze


Post Test Fuze Ejected from the Grenade

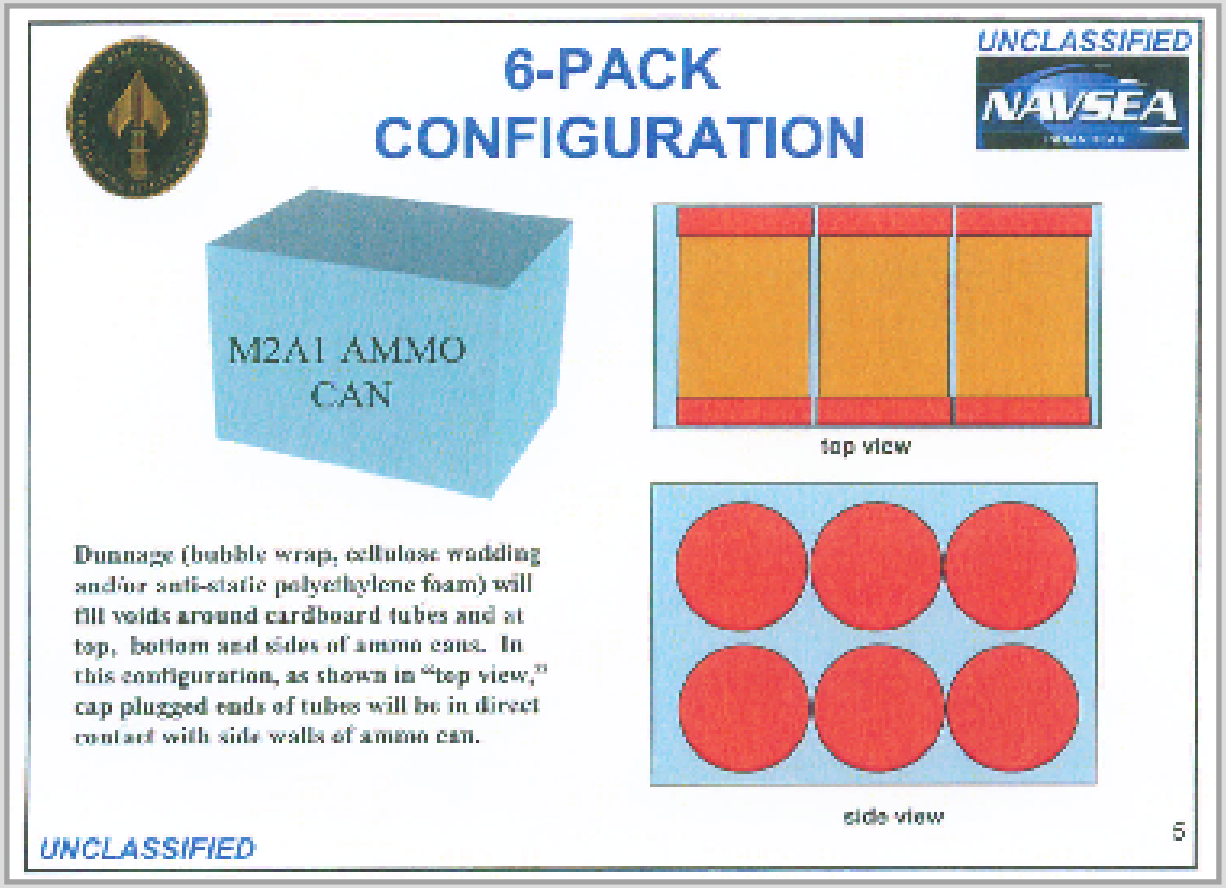
# Slow Cook Off M67 Grenade, M213 Fuze Post Test

Fuze Ejected from the Grenade

# Fast Cook Off ASM Grenade, M228 Fuze Post Test

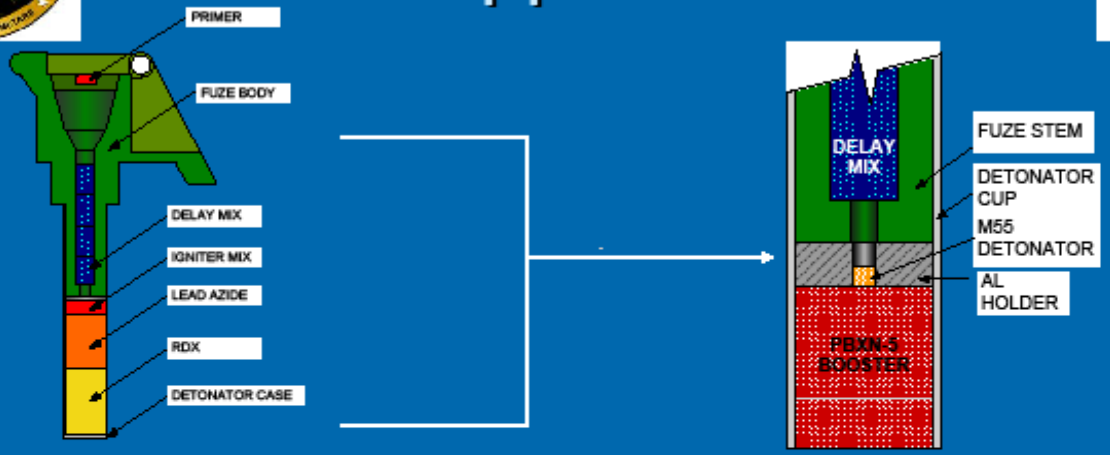
Fuze Ejected from the Grenade

# ASM Grenade Container



# From 2008 Fuze Conference, G. Chang

## Approach




- M55 Detonator to Booster
  - Reduced quantity of lead azide and lead styphnate
    - Improve Safety
  - Single point failure issue resolved

# Fuze Column Improvement