9mm SMAW MK217 Cartridge

A Wild Ride – for a wild & weird cartridge

NDIA ARAMAMENTS MAY 10, 2018

Indianapolis, IN

9MM SMAW CARTRIDGE

A Wild Ride because …..

1) Extremely unique cartridge – numerous technical challenges

2) Long personal/company history going back over 35 years with my father – Brass Extrusion Labs Ltd.(B.E.L.L.) and MAST Technology

3) On its *last production run* for the last 20 years, including this current run on a 5 year IDIQ

4) Tail wagging the dog on velocity – cartridge sets rocket velocity, in some cases. Ballistic match to the rockets.

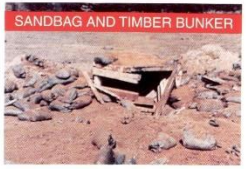
5) MAST was founded to go after this contract

6) This was Brass Extrusions first intro into DOD contraxcts

9MM SMAW CARTRIDGE

Overall History –
-Israeli Design – unverified
-Radaway Green Build in Late 1970's
-Brass Extrusion Labs Limited Build in 1980's for McDonald Douglas
-MAST founded July 1990 to go after SMAW Cartridge
-MAST Build for ATK in 1993
- MAST lost 1st Army contract 1994 only to return after competitor T/D
- Multiple MAST builds including current 5 year for Nammo-Talley to US Army

TARGET EFFECTS



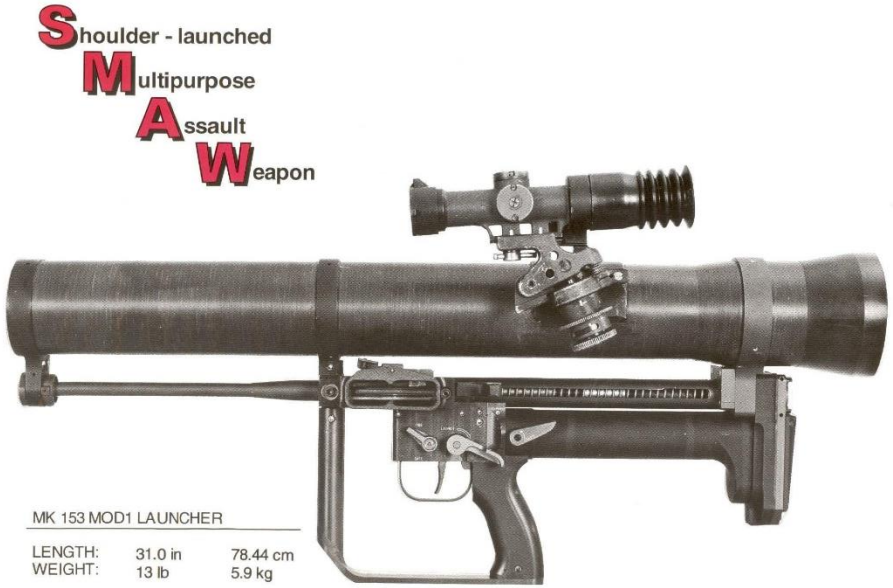
MUNITIONS	HEDP High Explosive Dual Purpose		HEAA High Explosive Anti-Armor		CPR Common Practice Round	
ENCASED ROCKET:						
Length:	29.50 in	74.93 cm	33.20 in	84.33 cm	29.50 in	74.9 cm
Weight:	13.10 lb	5.95 kg	14.10 lb	6.40 kg	13.25 lb	6.01 kg
ASSAULT ROCKET:						
Length:	22.2 in	56.4 cm	32.4 in	82.3 cm	22.0 in	55.9 cm
Weight:	9.58 lb	4.35 kg	9.72 lb	4.41 kg	9.66 lb	4.38 kg
WARHEAD:						
Length:	7.5 in	19.05 cm	16.0 in	40.7 cm		
Weight:	4.31 lb	1.96 kg	3.55 lb	1.61 kg		
WEAPON READY-TO-FIRE:						
Length:	54.25 in	137.80 cm	54.25 in	137.80 cm	54.25 in	137.80 cm
Weight:	26.00 lb	11.80 kg	27.80 lb	12.62 kg	26.00 lb	11.80 kg

MUZZLE VELOCITY: 720 ft/sec (nominal) 219 m/s
FIRING RANGE: 500 meters

CMS Defense Systems
P.O. Box 5990 · Titusville, FL 32783
Tel: 1-407-268-4020 · Fax: 1-407-268-0474

9MM SMAW CARTRIDGE

Personal History –
B.E.L.L. - Early 80's Target Pit Crew
B.E.L.L. - Mid 80's Packing into 20 Rd boxes
MAST – Mid 90's machine operator
MAST – Mid 90's Outdoor Range Ballistician
MAST – Late 90's Program Manager
MAST – Early 2000's B/P & PM
MAST – Late 2000's B/P & SME
MAST – Late 2010's B/P & SME



MAST TECHNOLOGY

9MM SMAW CARTRIDGE

Cartridge Purpose –

1) Spotting Cartridge for SMAW Rocket – HEDP, HEAA & CP
2) Ballistic Match to 83mm Rocket – same Arc and trajectory
3) Lasers not developed in 70's and 80's
4) Lasers don't work well in snow, rain or other interference
5) Spotting Cartridge act similar to rocket in wind & environmental
6) Similar to AT4 and other shoulder launched

MAST TECHNOLOGY

9mm SMAW Weapon

83mm SMAW Rockets

	LENGTH	WEIGHT
■ Weapon ready-to-fire with HEDP	54 in.(1372 mm)	28.9 lb.(13.13 kg)
with HEAA	54 in.(1372 mm)	30.7 lb.(13.95 kg)
■ Launcher as carried Common to HEDP and HEAA	32.5 in.(825 mm)	16.6 lb.(7.5 kg)
■ Encased rocket as carried		
HEDP	29.5 in.(749 mm)	13.1 lb.(5.95 kg)
HEAA	33.2 in.(843 mm)	14.1 lb.(6.4 kg)

HIGH EXPLOSIVE DUAL PURPOSE (HEDP) ROCKET

HIGH EXPLOSIVE ANTI-ARMOR (HEAA) ROCKET

MCDONNELL DOUGLAS ASTRONAUTICS COMPANY
P.O. Box 516
St. Louis, Missouri 63166
USA

M/C 306-4225
FAX 314-777-4836

C10/90A-05EA2

MAST TECHNOLOGY

CARTRIDGE DETAILS

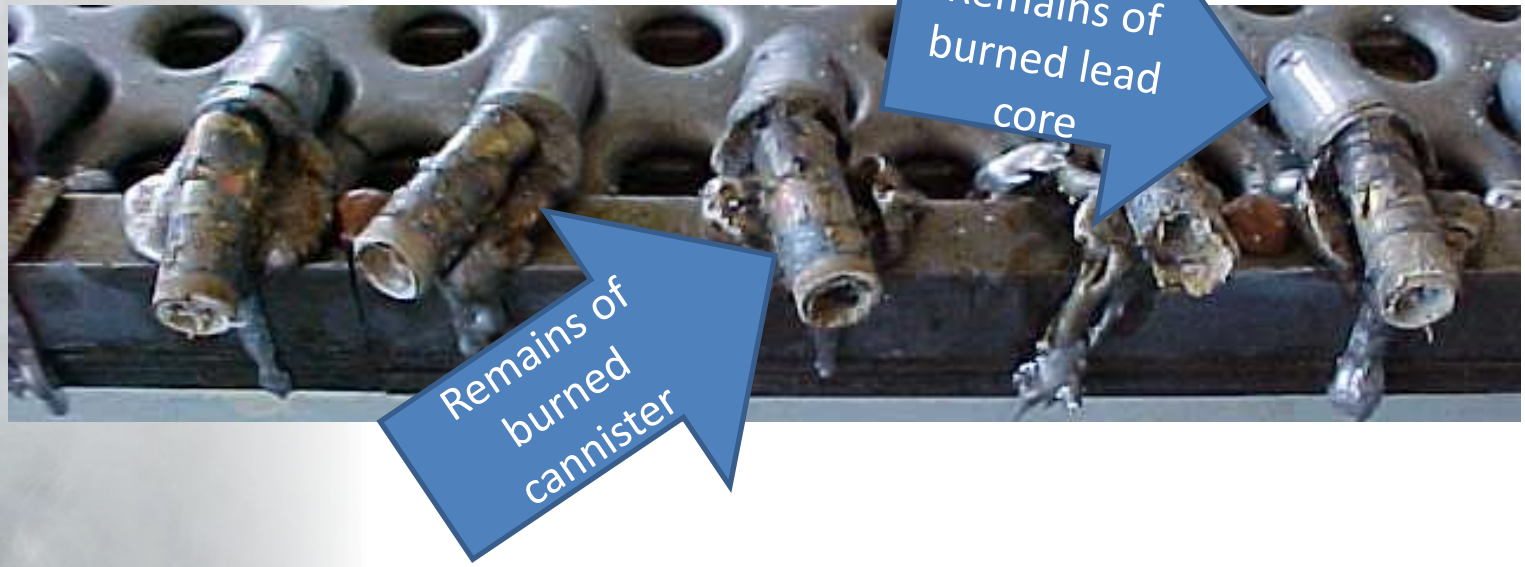
CTG DETAILS – CUSTOM PROJECTILE

-Purpose - Bullet Weight
- Ballistic Match to Rocket
- Copper Jacket Crimped on to aide feeding from magazine to weapon
- Tracer for tracking

CARTRIDGE TECHNICAL CHALLENGES

TDP/Spec Issue – Trace burn in lead bullet. Lead melts – who knew?

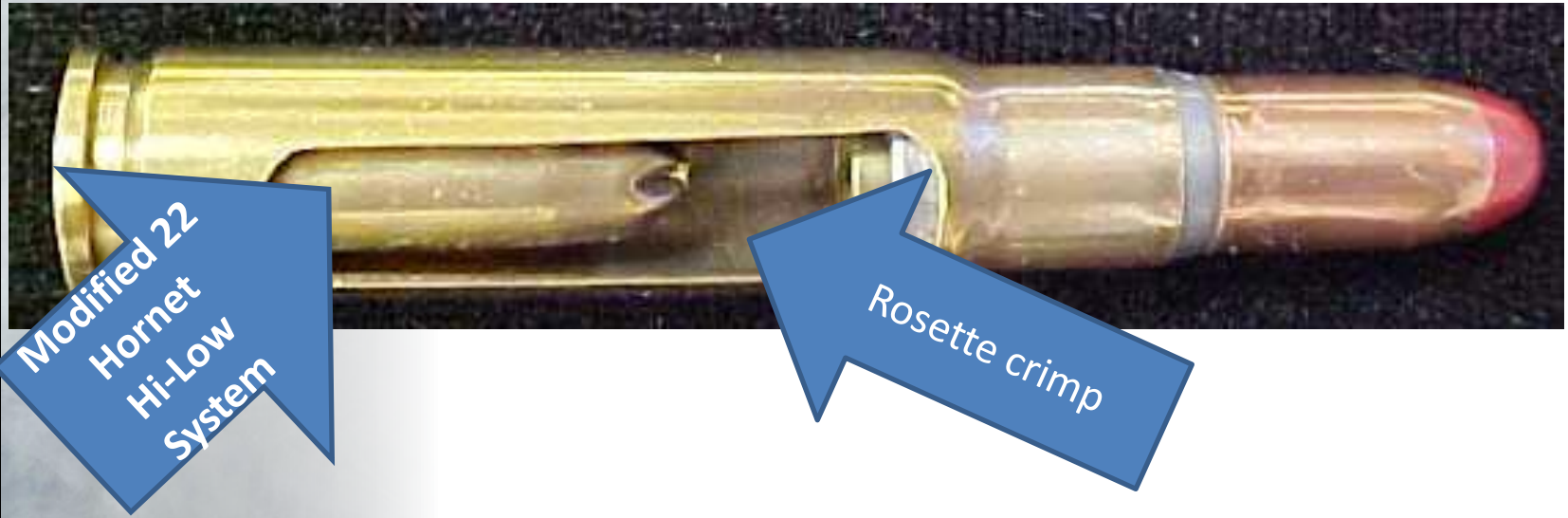
- 6 seconds burn is not uncommon
- Static Burn images below. 100% cannister separation in flight at 350-400M



CTG DETAILS HI-LOW SYSTEM

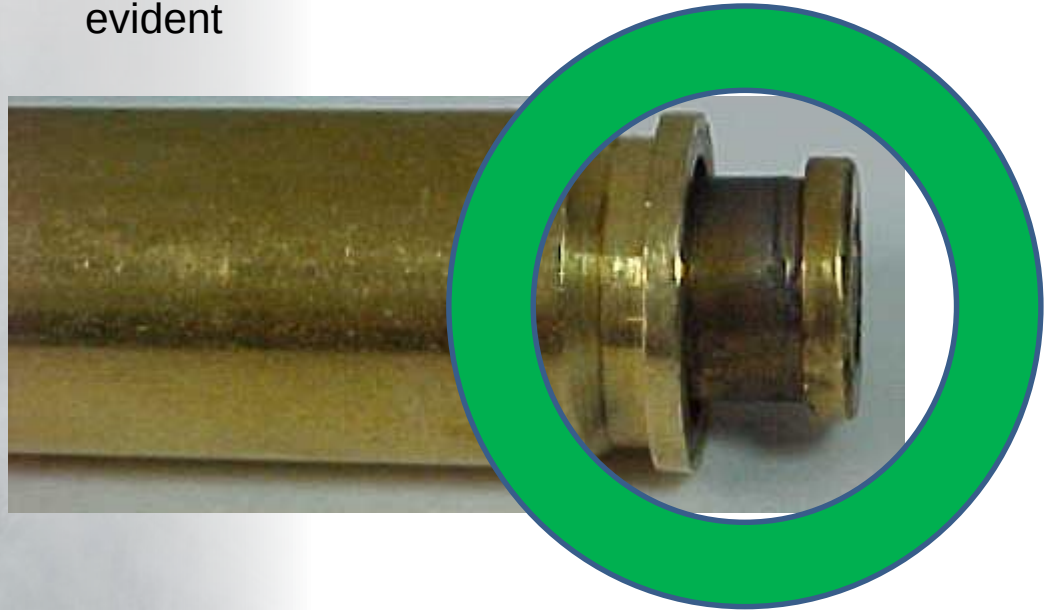
Purpose – 22 Hornet

- Hi-low system to contain propellant in controlled and have more consistent propellant burn & velocity
- To give ‘blow back’ to allow the weapon bolt to function/cycle backwards



CARTRIDGE TECHNICAL CHALLENGES

1) Blow back of Hornet required to function Semi-automatic Spotting Weapon – pictured is ideal state
2) TDP requires that hornet backs out (to cycle bolt), and gas escape is evident



CARTRIDGE TECHNICAL CHALLENGES

TDP/Spec failure

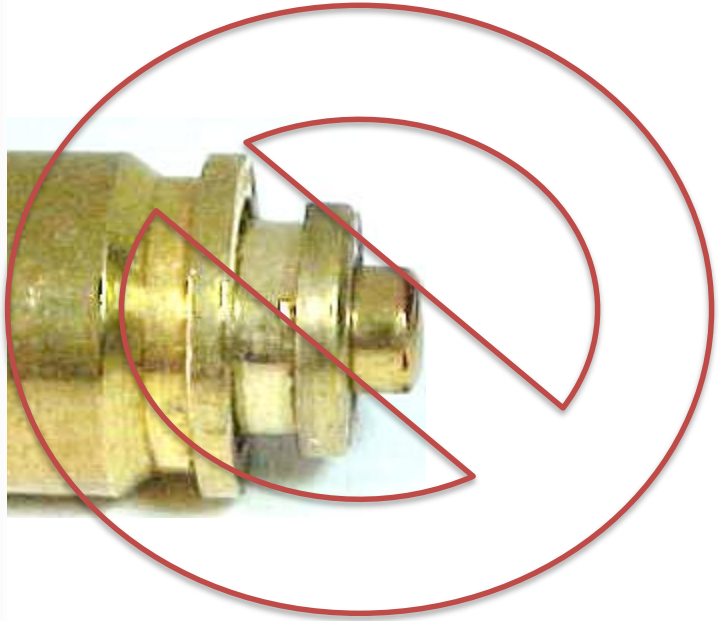
– no gas escape = lockup = failure

- result is considerably higher velocity

- Ignore primer backout for this slide (best picture available to show lockup)
- Often lockup also results in primer backout

CARTRIDGE TECHNICAL CHALLENGES

TDP/Spec failure – primer backout
Dropped primer – as always bad and could cause weapon failure



CARTRIDGE TECHNICAL CHALLENGES

Rosette crimp – the secrete sauce to ensure successful hornet backout without lockup or primer backout.

1) Asymmetrical crimp to ensure that the pedals rupture in an inconsistent manner.

2) Later we added a resize to ensure/control that the pedals open and allow the case to push backward to cycle the bolt

MAST TECHNOLOGY

CARTRIDGE TECHNICAL CHALLENGES

Weapon TECHNICAL Challenges

Old weapon issues created some live fire issues. MAST ended up doing weapon testing which resulted in finding a few issues with weapon.

One issue was springs that were delivered to the drawing however after 50 rounds would fail

Pictured to the right is our weapon spring testing setup

MAST TECHNOLOGY

Display

MAST TECHNOLOGY

Questions?

What is one thing you would Change about this Presentation?

MAST TECHNOLOGY

Questions?

Jay Bell | CEO & Majority Shareholder | *MAST Technology, Inc.*

Phone: (816) 796-0480 | jbell3@mast.bz