7.62mm, Lethal Limited Range Round For USCG
*Informational Brief for  NDIA 2010*
19 May 2010
Overview

• JSSAP funded effort for USCG
• 7.62mm Lethal Limited Range Round
• For use in harbor security applications.

Objectives

• Reduced maximum range
• Engage and defeat
- Defeat 1/4 inch of mild steel at 200 meters, at a 45-degree angle

- Match trajectory of M80 out to at least 400 meters.

- Capable of defeating soft target out to at least 400 meters.

- Maximum range of 2000 Meters (1500 Meters desirable)

- Capable of being fired from an M14 rifle and M240 Machine Gun
Value to Warfighter

- Operational environment close to civilian populace
- Lethal force often necessary to accomplish missions
- Use of Small Arms at times is restricted due to potential risk to civilians
- Reduced range ammunition will enable USCG to engage targets
Summary From 2008

- Brass M80 with forward facing fins
  - Pro
    - Low dispersion
  - Con
    - Poor target penetration

- Future Tasks
  - Model and Simulate projectile target penetration
  - Redesign for penetration and improved dispersion
  - Dispersion test at 400m
  - Radar test for max range
Penetration Simulation
1820 ft/s

MODEL 19200_8595669
Time = 0
Penetration Simulation
2230 ft/s
Design LDC-FB
50% Perforation

Design LC-FB
100% Perforation
Target Penetration 45 Deg Obliquity

M80 Ball
80% Perforation
Mach vs. Drag LC-FB

7.62mm USCG L2R2
ATC Test Result 16 Sept 2008

Effect of Cut Area On Drag

- LC – Hi Cd
- LC - M Cd
- M80

Mach vs. Drag LC-FB

- M80
- Large Cut - Medium Drag
- Large Cut - Hi Drag

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.
LC-FB Impact Locations on M80 Safety Fan

LC-FB fired from M240B at 10° & 30° QE

M80 Safety Fan Boundary

Ricochet Area

Range, m

Deflection, m

-2000.0 -1500.0 -1000.0 -500.0

0.0

500.0

1000.0

1500.0

2000.0

2500.0

3000.0

3500.0

4000.0

4500.0

0.0

500.0

1000.0

1500.0

2000.0
7.62 mm USCG $L^2R^2$

Drag Results of 17 June 09 ATC WEIBEL Radar Test

- LDC-FBT Low Drag
- LDC-FBT Hi Drag
- M80 Ball
LDC-FB Impact Locations on M80 Safety Fan

LDC-FB fired from M240B @ 10° & 30° QE

M80 Safety Fan Boundary

Ricochet Area

Deflection, m

Range, m
## M80 Ball vs. LC-FB vs. LDC-FB

<table>
<thead>
<tr>
<th>KPPs</th>
<th>M80 Ball</th>
<th>LC-FB</th>
<th>LDC-FB</th>
</tr>
</thead>
<tbody>
<tr>
<td>≈ Max Range, 10° QE (m)</td>
<td>2765</td>
<td>2390</td>
<td>1865</td>
</tr>
<tr>
<td>≈ Max Range, 30° QE (m)</td>
<td>3715</td>
<td>3283</td>
<td>1967</td>
</tr>
<tr>
<td>Function M240B</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Perforate Steel Target @ 200m at 45° angle</td>
<td>Y</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Defeat Soft Target @ 400m</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Match Trajectory of M80 @ 400M</td>
<td>—</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>
Trajectory Comparison between M80 and LDC-FB
300m Dispersion Test Results

300m Dispersion Results

-4 -2 0 2 4 6 8 10

M80
LDC-FB
400m Dispersion Test Results
M240B Machine Gun Functioning
Salt-Fog-Humidity Chamber
Salt-Fog-Humidity Results

Steel

Uncoated Brass

M80
Salt-Fog-Humidity Results

Nickel Coated Brass

Clear Coated Brass
Summary & Future Tasks

- Penetration 50%
- Threshold Max Range Requirement met
- Function requirement met
- 400m trajectory comparable to M80
- Brass Projectile better suited for Oceanic environment than M80

Future Tasks
- Find industry partner that is able to manufacture and load projectiles on a large scale
- Evaluate Key Performance Parameters on larger scale
Questions?
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Small Caliber Munitions Division
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### USCG $L^2R^2$

**Ordinate Match Between LDC-FBT and M80**

<table>
<thead>
<tr>
<th>Projectile</th>
<th>Muzzle Velocity (ft/s / m/s)</th>
<th>QE (mil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M80</td>
<td>2815 / 858</td>
<td>3.54</td>
</tr>
<tr>
<td>LDC-FB</td>
<td>3089 / 942</td>
<td>3.54</td>
</tr>
</tbody>
</table>

**Ordinate Match**

![Graph showing ordinate match between LDC-FBT and M80](image-url)
Note actual data from safety fan chart indicates that LDC-FB design meets max range requirement.
### 300m Dispersion Results

<table>
<thead>
<tr>
<th>Projectile</th>
<th>Mean Radius (in)</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>M80</td>
<td>2.53</td>
<td>0.22</td>
</tr>
<tr>
<td>M80 Brass</td>
<td>4.35</td>
<td>0.38</td>
</tr>
<tr>
<td>LDC-LF</td>
<td>8.03</td>
<td>0.69</td>
</tr>
<tr>
<td>LDC-NB</td>
<td>9.62</td>
<td>0.83</td>
</tr>
<tr>
<td>LDC-FB</td>
<td>3.23</td>
<td>0.28</td>
</tr>
<tr>
<td>LC-NB</td>
<td>5.82</td>
<td>0.50</td>
</tr>
<tr>
<td>LDC-SF</td>
<td>4.42</td>
<td>0.38</td>
</tr>
</tbody>
</table>

#### Graph

![Graph showing 300m Dispersion Results]
400m Dispersion Test Results

<table>
<thead>
<tr>
<th>Projectile</th>
<th>Mean Radius (in)</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDC-FB</td>
<td>8.6</td>
<td>0.75</td>
</tr>
<tr>
<td>M80</td>
<td>3.0</td>
<td>0.26</td>
</tr>
</tbody>
</table>

400m Dispersion Results

![400m Dispersion Results](image_url)