1998 NDIA SMALL ARMS SYSTEM CONFERENCE

THE M240B MG BUFFER STORY

BY

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- ARL - TIM BROSSEAU - KINEMATIC INVESTIGATIONS
- ENIDINE CORP - HYDRAULIC BUFFER DESIGN/FABRICATION
- FNMI - BACKPLATE DESIGN REFINEMENT/PRODUCIBILITY INPUT
- PM SMALL ARMS - FUNDING SUPPORT/USER INTERFACE

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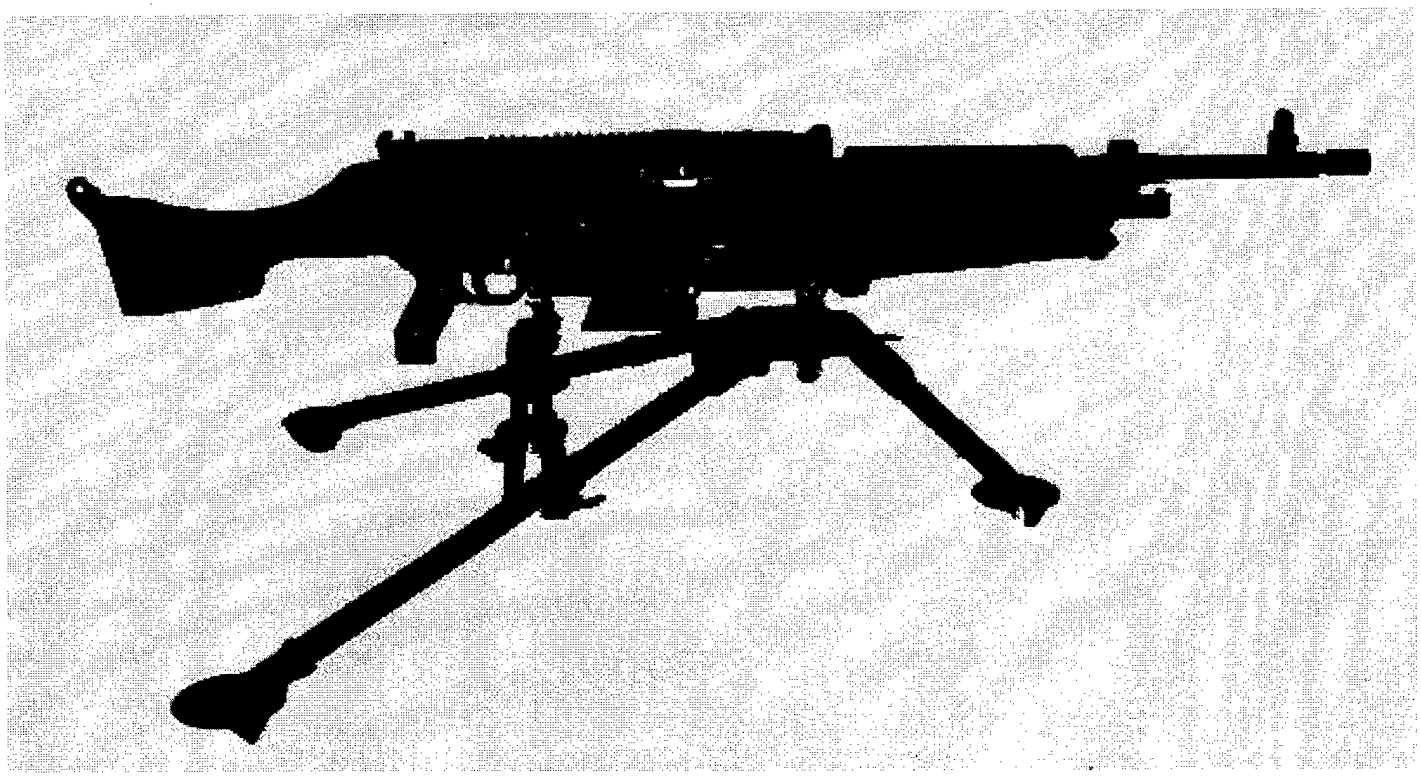
M240B MG ON M122A1 TRIPOD MOUNT



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BACKGROUND:

- M240B, 7.62MM MG SYSTEM: TC-STD - APRIL 1996
  FIELDED - AUG 1997

- WEAPON SYSTEM EXTREMELY RELIABLE BUT HEAVIER THAN WEAPON SYSTEM IT REPLACED

- OCT 1996 - ENGR STUDY APPROVED TO EVALUATE METHODS TO REDUCE SYSTEM WEIGHT AND COST

- ENGR STUDY RESULTS INDICATED THAT HYDRAULIC BUFFER RECOIL SYSTEM COULD ACHIEVE WEIGHT/COST REDUCTIONS

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- HYDRAULIC BUFFER MATERIAL CHANGE PROGRAM APPROVED JUNE 1997
- PROGRAM GOALS:
  - REDUCE SYSTEM WEIGHT
  - LOWER WEAPON CYCLIC RATE (IMPROVED CONTROLLABILITY)
  - NO RECEIVER/BUTTSTOCK MODIFICATIONS REQUIRED
  - LOWER SYSTEM COSTS
  - NO DECREASE IN SYSTEM RELIABILITY

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- **STANDARD M240B SYSTEM PARAMETERS:**
  - GAS-OPERATED WEAPON WITH 3 POSITION GAS REGULATOR
  - NORMAL CYCLIC RATE OF 700-750 SPM (NEW) (G.P. #1)
  - UPON BREAK-IN CYCLIC RATE CLIMBS TO 850-900 SPM
  - HIGH CYCLIC RATE REQUIRES "FLEXMOUNT" TO DAMPEN WEAPON MOTIONS ON M122 TRIPOD
  - FLEXMOUNT ADDS WEIGHT AND COST TO SYSTEM

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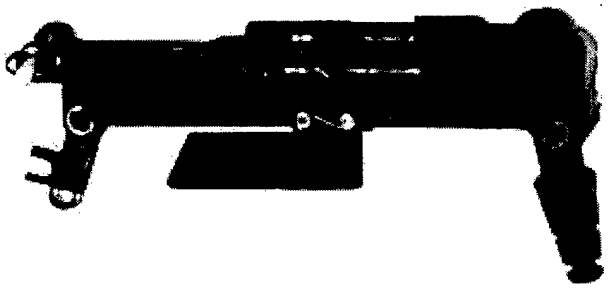
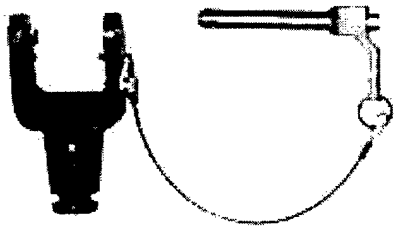
- **HYDRAULIC BUFFER DESIGN APPROACH:**
  - FUNCTION WEAPON RELIABLY AT -50°F TO +160°F WITH EXISTING BARREL/GAS SYSTEM
  - REDUCE CYCLIC RATE TO 600 + 50 SPM
  - ELIMINATE NEED FOR FLEXMOUNT
  - NO MODIFICATIONS TO RECEIVER OR BUTTSTOCK
  - MAINTAIN CURRENT WEAPON'S HIGH RELIABILITY
  - RETROFIT CONVERSION OF FIELDED WEAPONS DOABLE BY UNIT ARMORER

- **HYDRAULIC BUFFER CHARACTERISTICS IN M240B APPLICATION:**
  - BUFFER IS DASHPOT DESIGN WITH SINGLE PISTON
  - TYPICAL PISTON STROKE IS 0.500 INCH - 0.510 INCH
  - MAXIMUM PISTON STROKE IS 0.571 INCH (CONTACTS BACKPLATE)
  - HYDRAULIC FLUID FILLED
  - SERVICE LIFE: 50,000 CYCLES MINIMUM
  - OPERATING TEMPERATURE RANGE: -50°F TO +160°F

M240B STD BUFFER COMPONENTS VS. HYDRAULIC BUFFER SYSTEM





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- **TEST RESULTS (ARDEC)**

CHARACTERISTIC	STANDARD M240B	HYDRAULIC BUFFER M240B
• CYCLIC RATE (SPM)	790-825	630-640
• BELT PULL (AVG-LBS) (REQ - 10.5 LBS MIN)	25	19
• ACCURACY (M.R. -300M)	10.02 IN	6.20 IN
• DISPERSION (300 M)		
EXT. SPREAD X	28.31 IN	12.4 IN
EXT. SPREAD Y	15.06 IN	14.87 IN
• RELIABILITY (MRBF) (15,000 RDS. MIN)	EXCEEDED	EXCEEDED

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- **WEAPON RELATED CHANGES:**

PART NAME	STANDARD M240B	HYDRAULIC BUFFER M240B
• BACKPLATE/BUFFER ASSEMBLY	1.44 LBS	1.02 LBS
• BUTT SCREW	0.11 LBS	0.04 LBS
TOTAL	**1.55 LBS**	**1.06 LBS**

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M122 TRIPOD MOUNT RELATED CHANGES:

PART NAME	STANDARD M240B	HYDRAULIC BUFFER M240B
• FLEXMOUNT	4.88 LBS	———
• PINTLE	———	1.38 LBS
• 13MM Q.R. PIN & LANYARD	———	0.34 LBS
• T+E BRACKET ASSEMBLY	———	0.74 LBS
TOTALS	**4.88 LBS**	**2.46 LBS**

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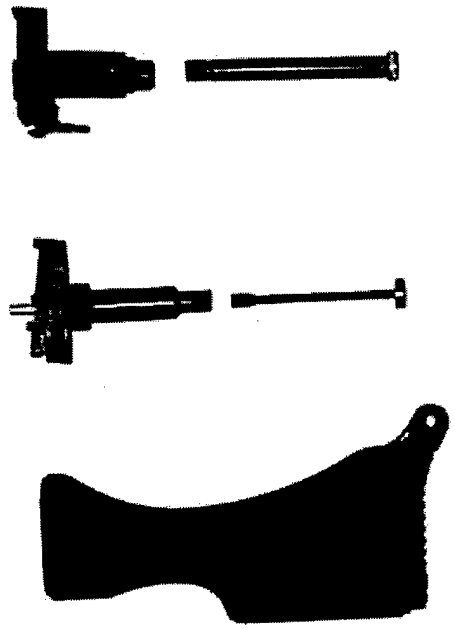
M240B/M122 TRIPOD RELATED MOUNTING DIFFERENCES

- STANDARD M240B VS. HYDRAULIC BUFFER M240B



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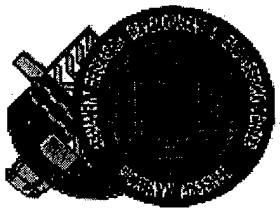

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- **EFFECT ON SYSTEM COST (PRODUCTION)**

ITEM DESCRIPTION	CURRENT M240B PARTS	HYDRAULIC BUFFER M240B PARTS
• BACKPLATE, BUFFER CATCH/ASSY	$172	—
• BACKPLATE/BUFFER CATCH	—	$125
• BUTT SCREW	$ 10	$ 10
• HYDRAULIC BUFFER	—	$ 95
• FLEXMOUNT	$475	—
• PINTLE/13MM PIN	—	$ 85
• T+E BRACKET ASSEMBLY	—	$ 35
TOTALS	**$657**	**$350**

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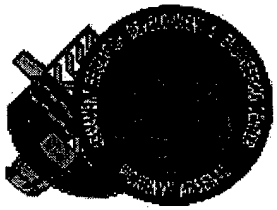
- **ADVANTAGES OF HYDRAULIC BUFFER SYSTEM:**
  - REDUCTION IN SOLDIER LOAD OF APPROX. 3 LBS.
  - REDUCTION IN CYCLIC RATE (IMPROVED CONTROLLABILITY)
  - MORE ACCURATE/LOWER DISPERSION
  - WEAPON SYSTEM COST REDUCTION OF $300/UNIT (PRODUCTION)
  - NO MODIFICATION OF RECEIVER OR BUTTSTOCK REQUIRED
  - SIMPLE CHANGEOUT OF PARTS TO RETROFIT FIELDED WEAPONS
  - RELIABILITY MAINTAINED

- **DISADVANTAGES OF HYDRAULIC BUFFER SYSTEM:**
  - RETROFIT COSTS OF $350/SYSTEM FOR FIELDED WEAPONS
  - LOWER BELT PULL VALUE



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- **PROGRAM STATUS:**
  - SYSTEM IN TESTING MAR-JUN 98 AT ABERDEEN TEST CENTER
  - TEST DATA AVAILABLE - JUL 98
  - PRODUCTION DECISION - 4QFY98
  - AWARD PRODUCTION CONTRACTS - 1QFY99
  - FIRST HARDWARE DELIVERIES - 3QFY99
  - INITIAL FIELDINGS OF NEW SYSTEM - 4QFY99

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