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ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NJ

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Improved Moveable Weapon Mount System for the CH-47 Helicopter

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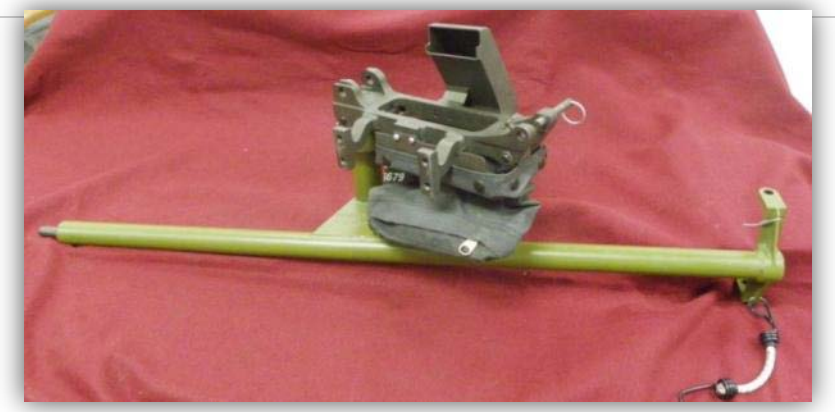
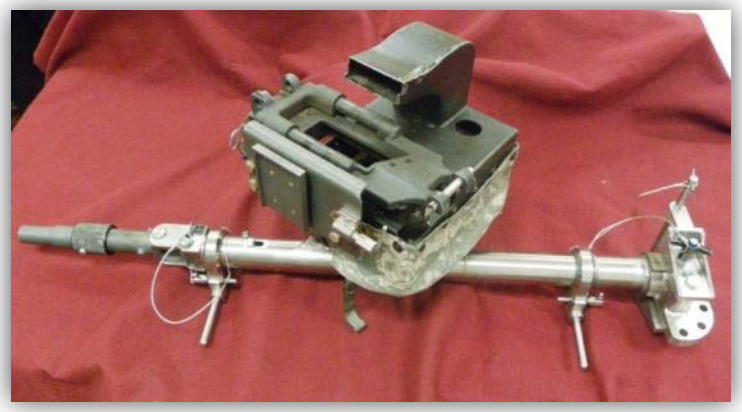
Background – M24E1/E2 Program

- The current machine gun mount for the CH47 is the M24 – a stationary bar mount that mounts in the door and window of the aircraft and accepts the M240H machine gun.
- A need arose for a new mount to eliminate some deficiencies that are present in the M24.





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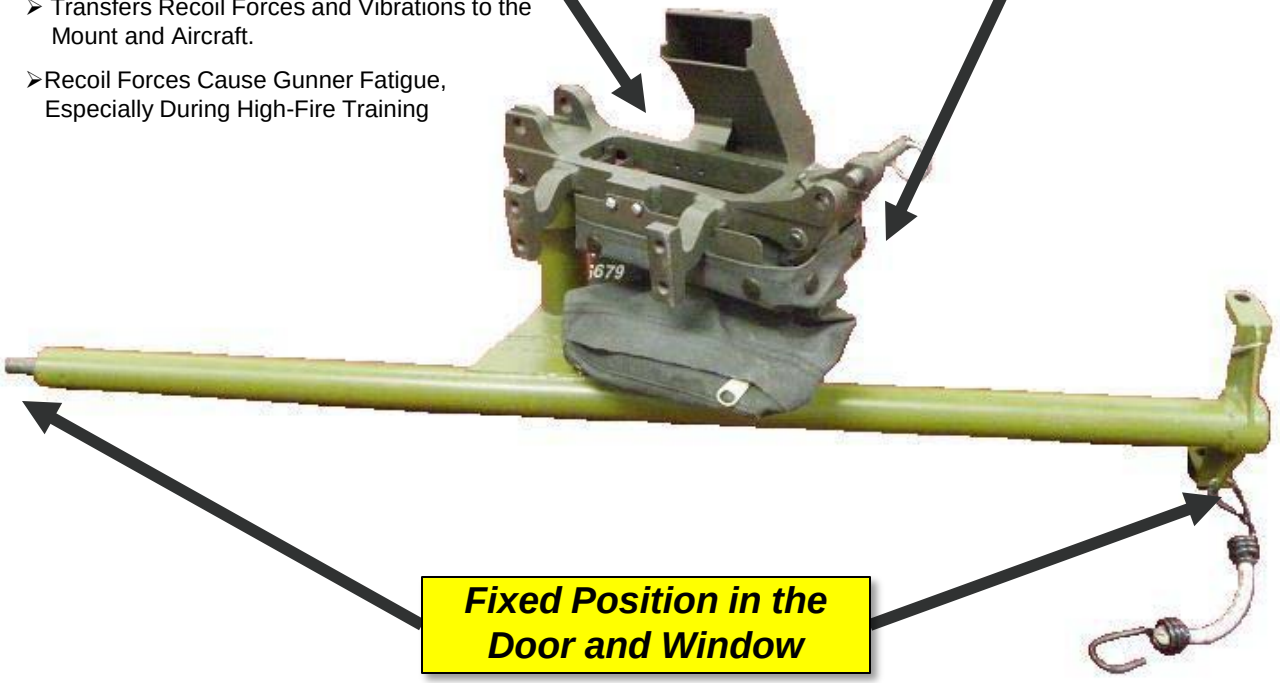
M24 Machine Gun Mount - Deficiencies

Rigid Cradle

- Cradle is Solid Steel
- Transfers Recoil Forces and Vibrations to the Mount and Aircraft.
- Recoil Forces Cause Gunner Fatigue, Especially During High-Fire Training

Case and Link Collection

- Only 200 Round Capacity
- Bag is Very Weak – Tears Easily
- Bag Interferes with Bar When Full



Ammunition Container

- 200 Round Capacity
- Ammo Can is Held in Place by Bungee Cord
- Ammo Easily Falls Out of the Can

Fixed Position in the Door and Window

- Puts Soldiers at Risk in Emergency Situations
- Makes Egress Difficult
- Makes Hot Refueling Difficult Without Removing the Mount

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M24E1 User Evaluation Machine Gun Mount

Flex-Mount Cradle

- Flexible Cradle Recoils with the Weapon
- Increases Accuracy
- Decreases Gunner Fatigue

Lightweight Construction

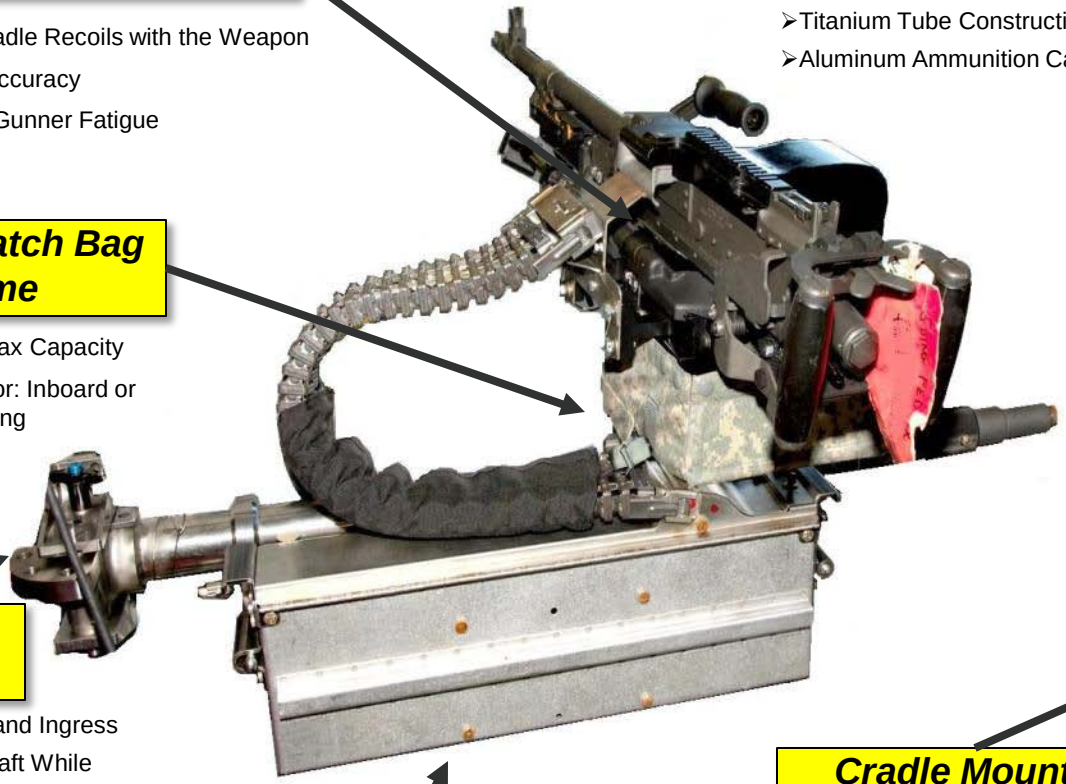
- Titanium Tube Construction
- Aluminum Ammunition Cans

Modular Design

- Same Mounting Positions
- Improved Field-of-Fire
- Two Ammunition Can Choices:
  - Cradle Mounted
  - Cross-Bar Mounted
- Quick Change Ammo Can Config (4 Bolts & Mounting Bracket)

Improved Catch Bag & Frame

- 450 Case & Link Max Capacity
- Reversible Zipper for: Inboard or Outboard Discharging



Pivoting Cross Bar

- Allows Easy Egress and Ingress
- Can Rotate into Aircraft While Weapon is Installed

Cradle Mounted Ammunition Can

- 400-Round Capacity
- Anti-Siphon Clip
- Faster Loading
- Decreases Ammo Can Swapping

Cross-Bar Mounted Ammunition Can

- 400-Round Capacity
- Anti-Siphon Spring
- Increases Gunner's Field-of-View
- Decreases Weight of Weapon

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M24E1 Machine Gun Mount

M24E1 Operation – Articulation

1) Pull Aft Hinge Pin

2) Pull Safety Pin

M24E1 Operation – Articulation

3) Slide Forward to Release

4) Swing Mount Inside Aircraft

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M24E1 Operational Positions

Just a few simple steps to go from Deployed to Open to Stowed

Locking Pin

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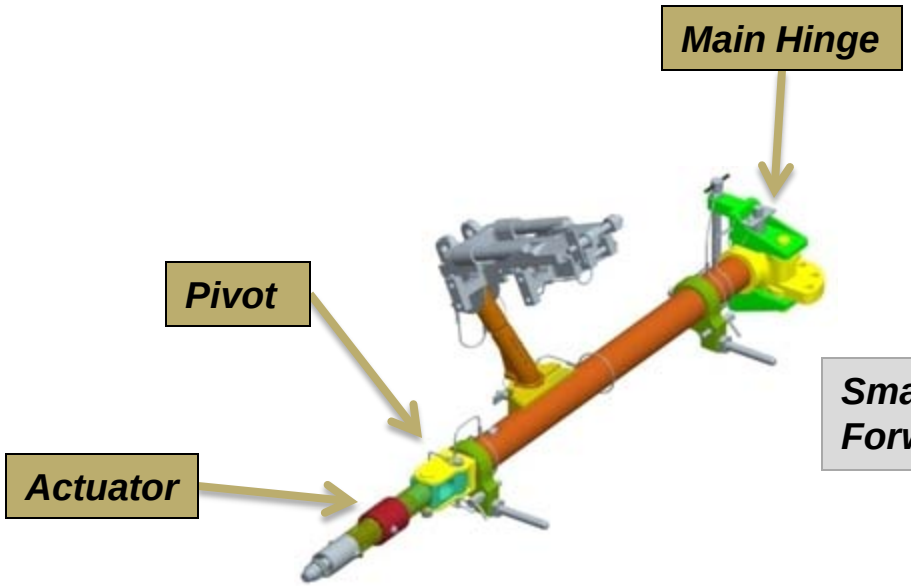
M24E1 vs. M24E2 Comparison

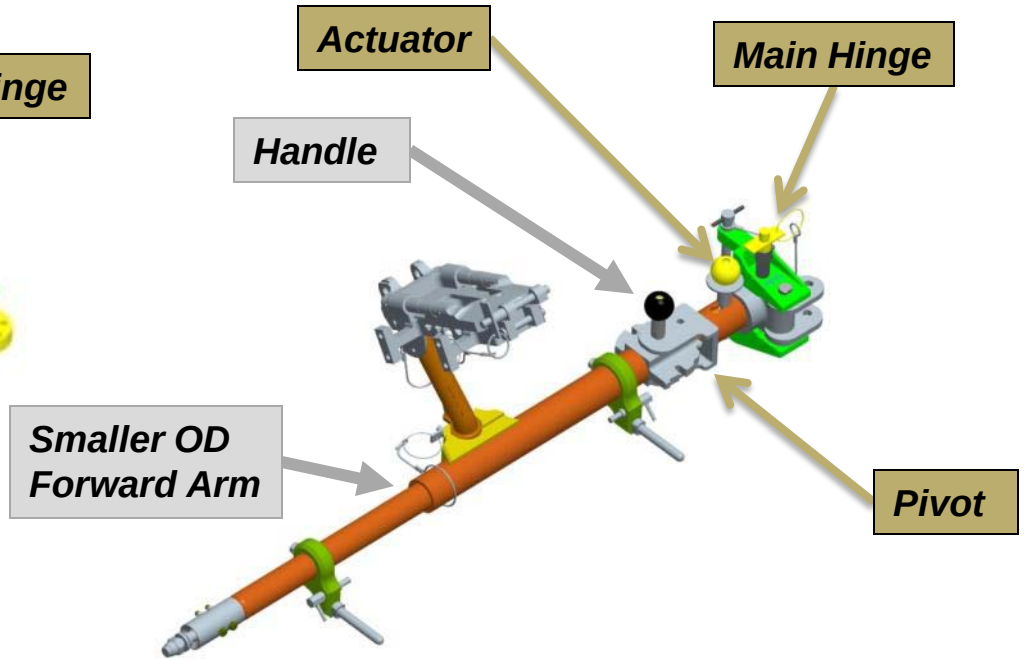
M24E1



M24E1

Rotates Into Aircraft

M24E2



M24E2

Rotates Into Aircraft

Rotates Out of Aircraft

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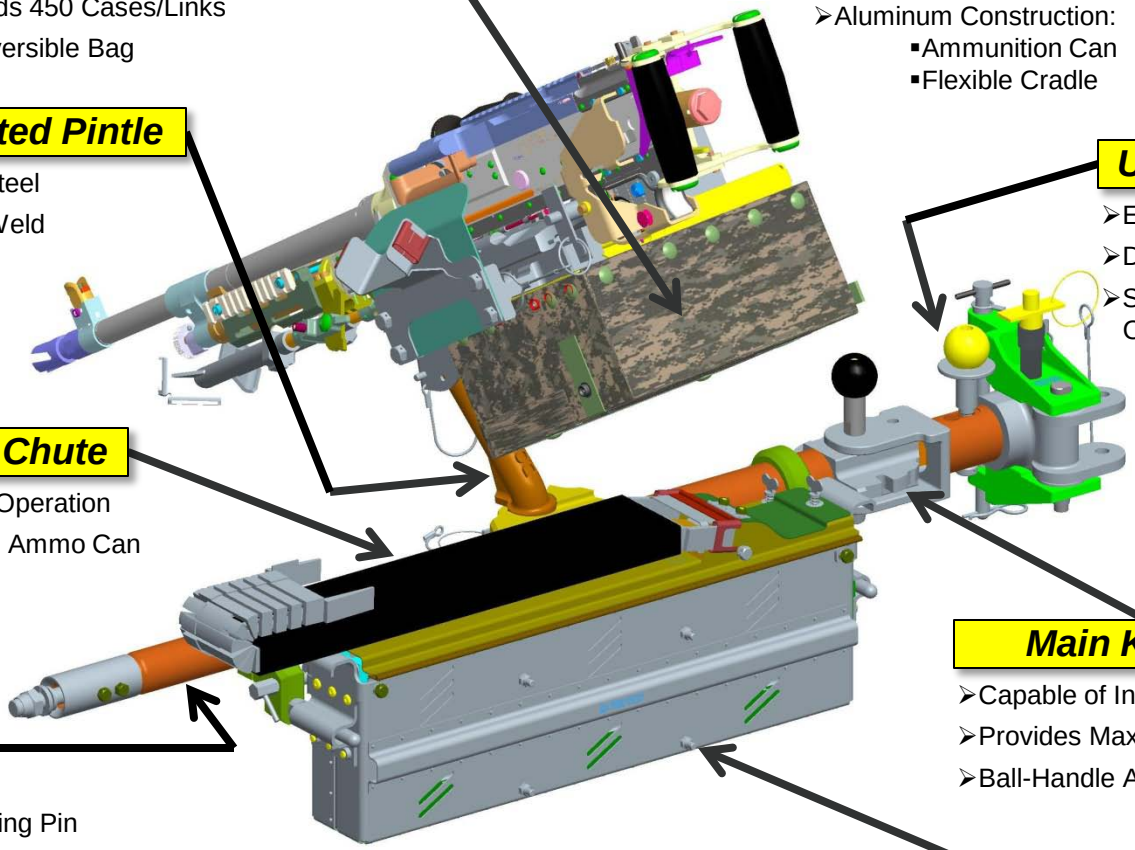
M24E2 Helicopter Mount Design Features

Case Collection System
- Holds 450 Cases/Links
- Reversible Bag

Lightweight Construction
- Titanium Tube Construction
- Aluminum Construction:
  - Ammunition Can
  - Flexible Cradle

Single-Piece Casted Pintle
- Made of 15-5PH CRES Steel
- Eliminates Possibility of Weld Cracking and Corrosion
- Minimizes Manufacturing Complexity

Unlocking Mechanism
- Eliminates Additional Safety Pin
- Decreases Moving Parts
- Simple, Quick Operation for Outboard Swing



Ammunition Feed Chute
- Very Durable and Smooth Operation
- One Feed Chute For Every Ammo Can

Main Knuckle
- Capable of Inboard and Outboard Articulation
- Provides Maximum Door Clearance
- Ball-Handle Added for Ease of Use

Small Diameter Cross Bar
- Interfaces Directly with Locking Pin
- No Modification to Airframe

Cross-Bar Mounted Ammunition Can
- 400-Round Capacity
- Decreases Firing Weight for Gunner
- Increases Gunner's Field-of-View
- Additional Viewing Slots to Gauge Remaining Ammunition

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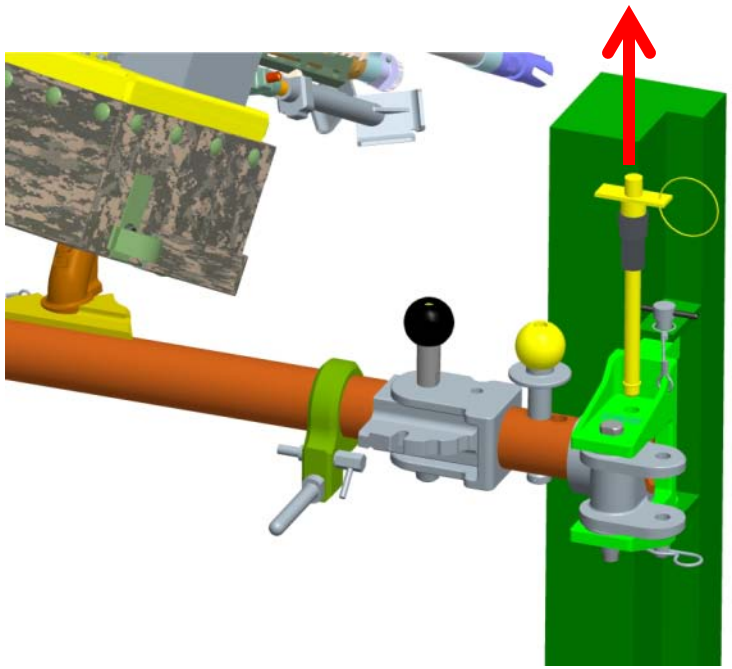
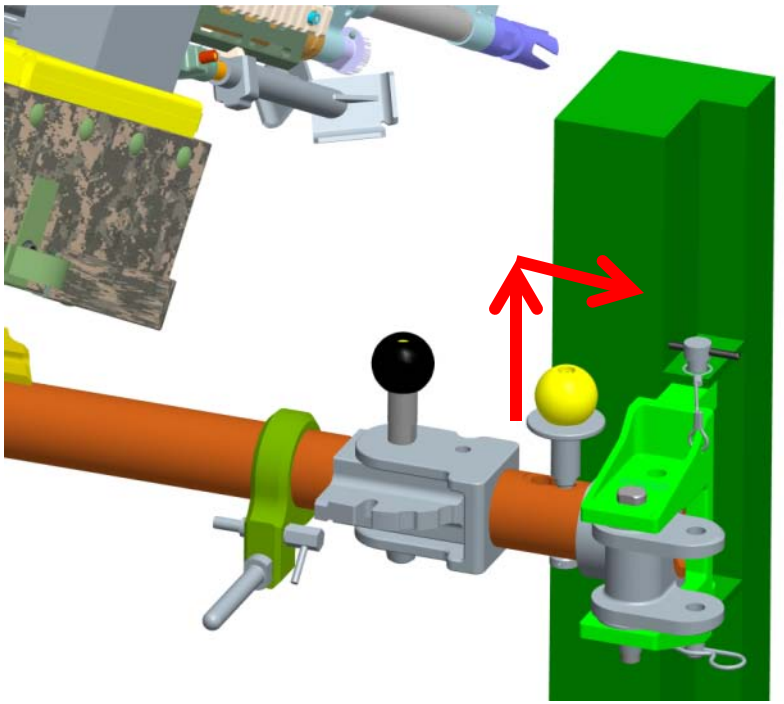
M24E2 Operation – Articulation



1) Pull Aft Hinge Pin

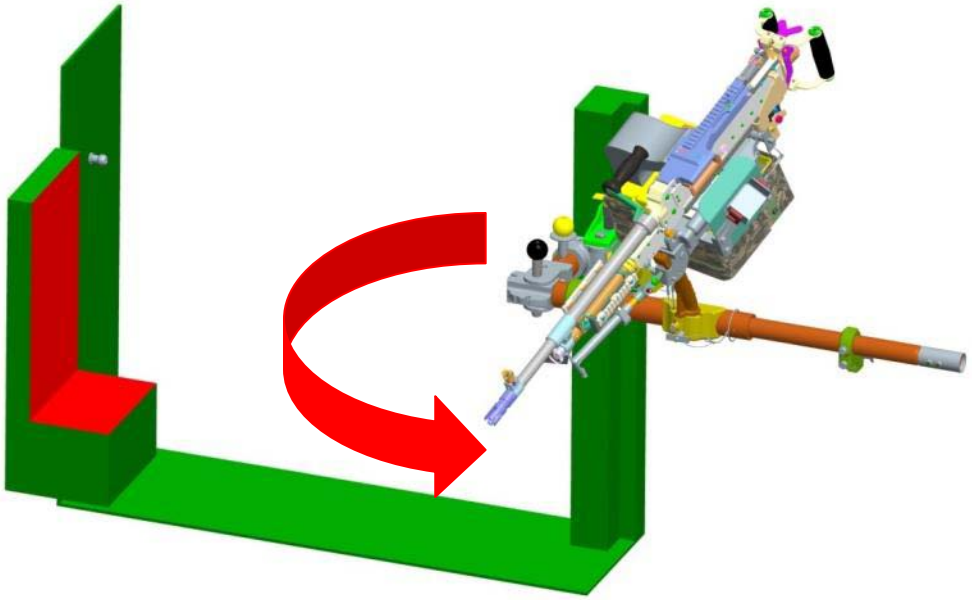


2) Compress Collar then Slide Rearward

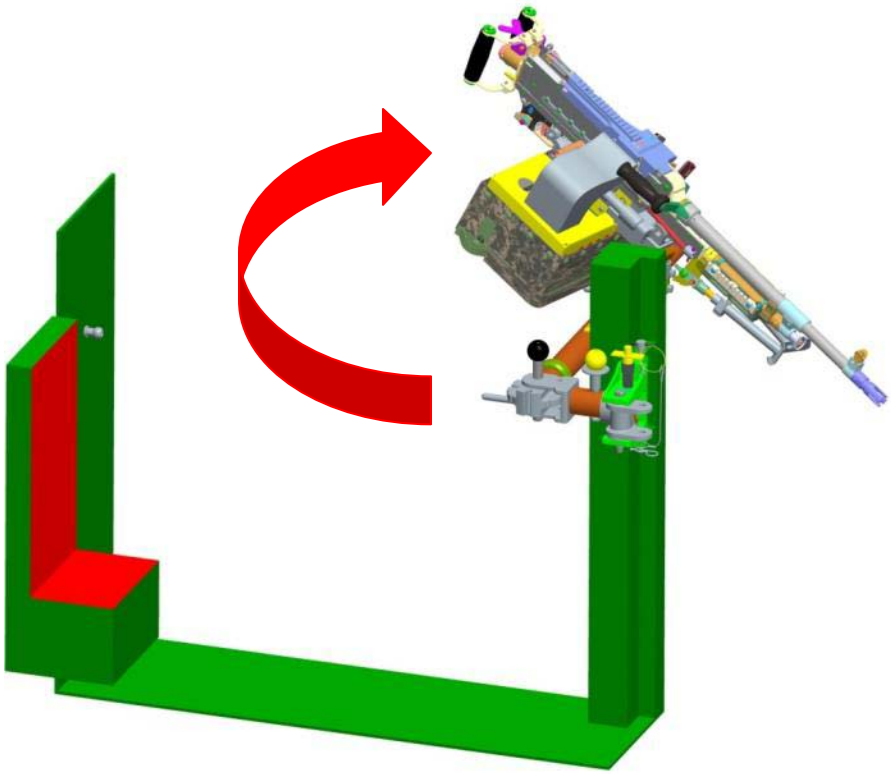
M24E2 Operation – Articulation

3) Swing Mount EITHER:

Inside Aircraft OR Outside Aircraft

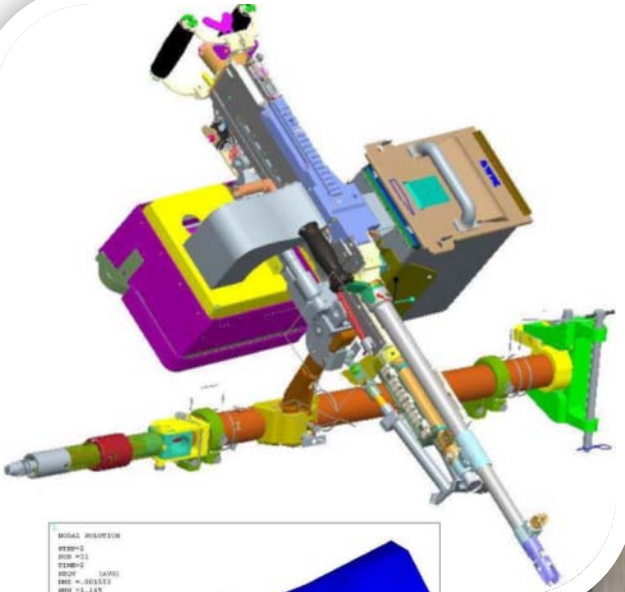


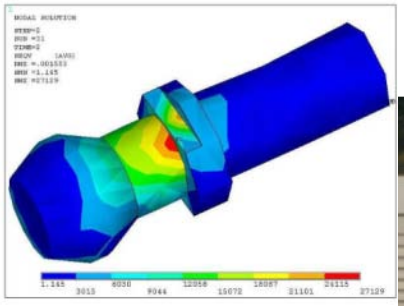
Primarily used during Regular Egress or Hot Refueling

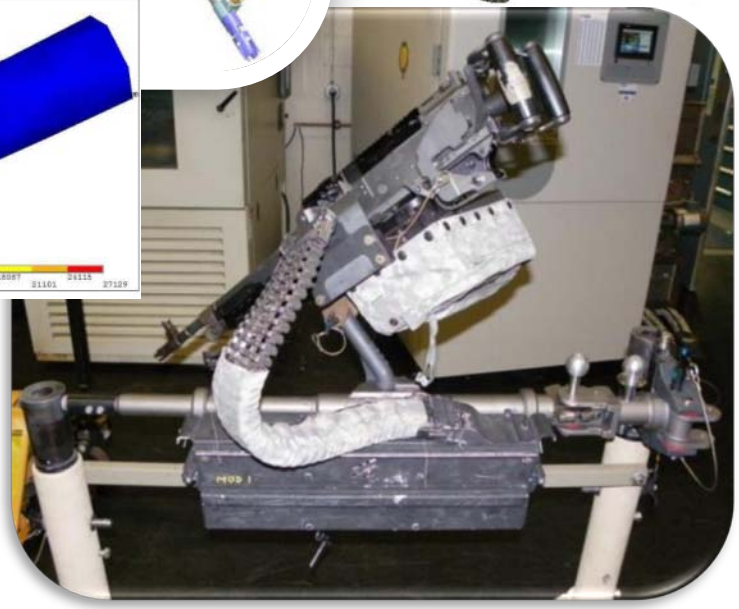


Primarily used for Emergency Egress

Testing - Simulated and Live-Fire







- Finite Element Analysis (FEA) used on Both M24E1 and M24E2
  - 8G Crash Loads
    - Positive and Negative X, Y, Z Directions
  - Recoil Loads Simulated
    - Help Predict Fatigue Life on Critical Parts

- Extensive Testing Performed at Picatinny's Armament Technology Facility (ATF) to Prove:
  - Both Systems (M24E1/M24E2)
  - Both Ammo Cans (Cradle/Bar)
  - Flexible Mount
  - Blank Firing

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Initial Testing and Verifications

❖ Initial Flight Tests

- ➢Performed at Fort Rucker, AL
- ➢Performed at Redstone Arsenal, AL
- ➢Testing Included:
  - ✓Vibration
  - ✓System Reliability
  - ✓User Feedback

❖Operational Testing and User Feedback

- ➢Fort Drum, NY
- ➢Fort Indiantown Gap, PA
- ➢Constantly on travel after Upgrades and Enhancements were made in order to test new performances and obtain first-hand Soldier feedback

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Applicability to Other Systems

- Technologies used in the M24E1 and M24E2 Mount Systems could be tailored to bring additional capabilities to the Warfighter
- Mount Systems are adaptable to other weapons and/or other aircrafts

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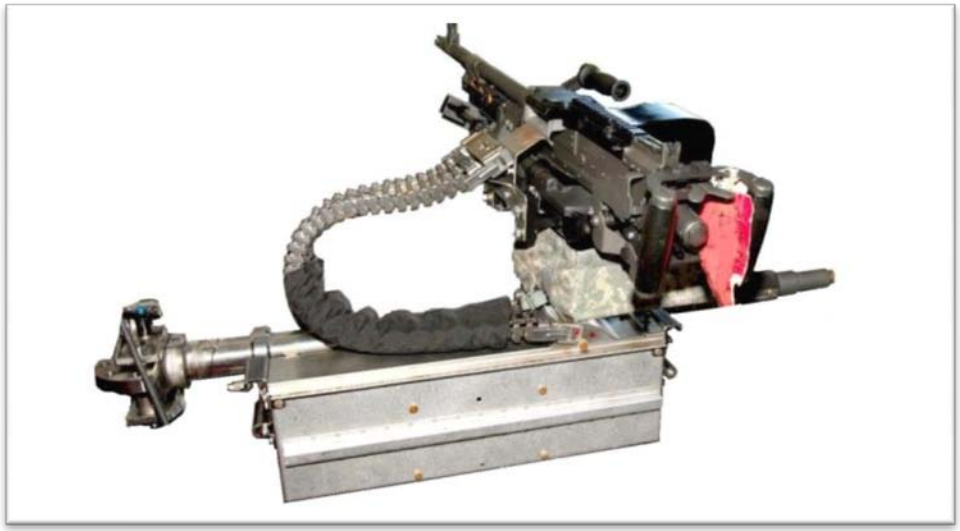
QUESTIONS?



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