AH-1W M197/M89 ENVIRONMENTAL KIT

NAVAIR Medium Caliber Aircraft Guns

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OVERVIEW

- Background and Purpose of Kit
- Kit Description and Installation
- BTL Testing
- Flight Test
- Production
- Summary

BACKGROUND

- Dirt and rocks caused high amount of Gun/Feeder stoppages during Desert Storm, Somalia, OEF, and continues to be a problem during OIF.
- Rock/Dirt intrusion remains primary cause of degraded AH-1W Gun Systems in OIF, more than 60% of AH-1W's have inoperable Gun Systems during Hi-Tempo Operations.

PURPOSE OF KIT

- Prevent rock/dirt/sand intrusion.
- Increase AH-1W Gun System reliability in austere conditions.
- Decrease maintenance man-hours.
- Increase Gun/Feeder service life.
- Regain Aircrew confidence in system.

DESCRIPTION OF KIT

- Covers most open areas on the Gun that are not required for operation.
- Consists of four stainless steel debris shields.
  - Rotor Cover
  - Housing Cover
  - Drive Motor Cover
  - Feeder Cover
- Requires a few consumables for mounting.

DESCRIPTION OF KIT

INSTALLATION

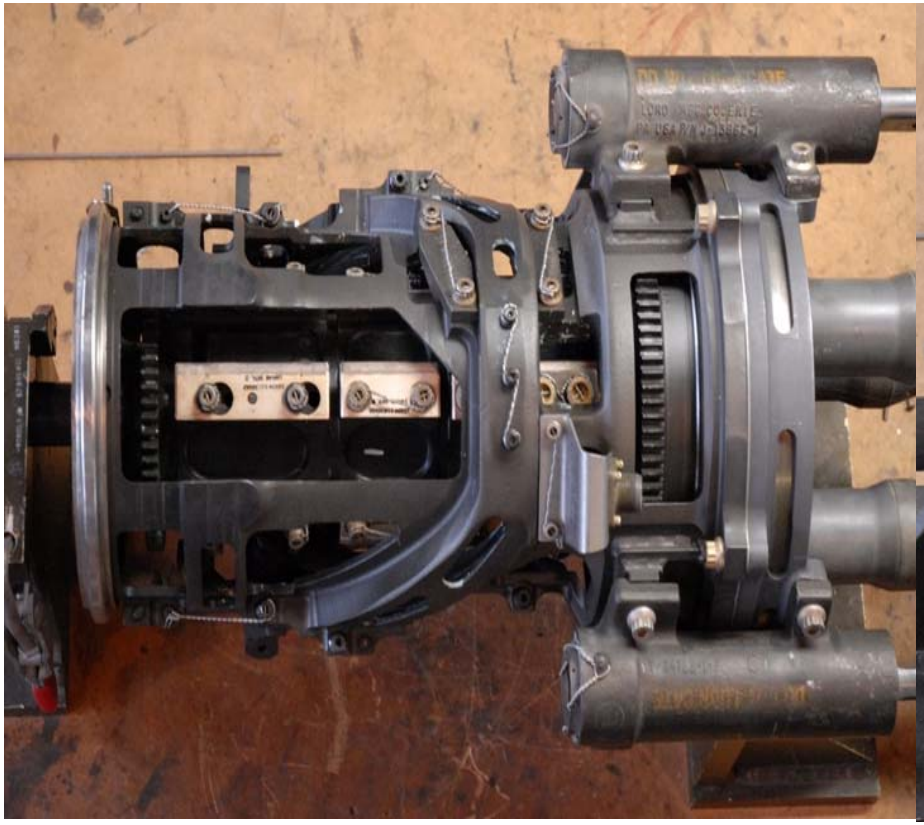
- Installed by O-Level in less than two hours.
- I-level tracking and procurement
- Does not affect current maintenance or operating techniques.
- Used as required in austere environments.
- Blade Tape used to cover remaining critical openings on the Gun and Feeder.

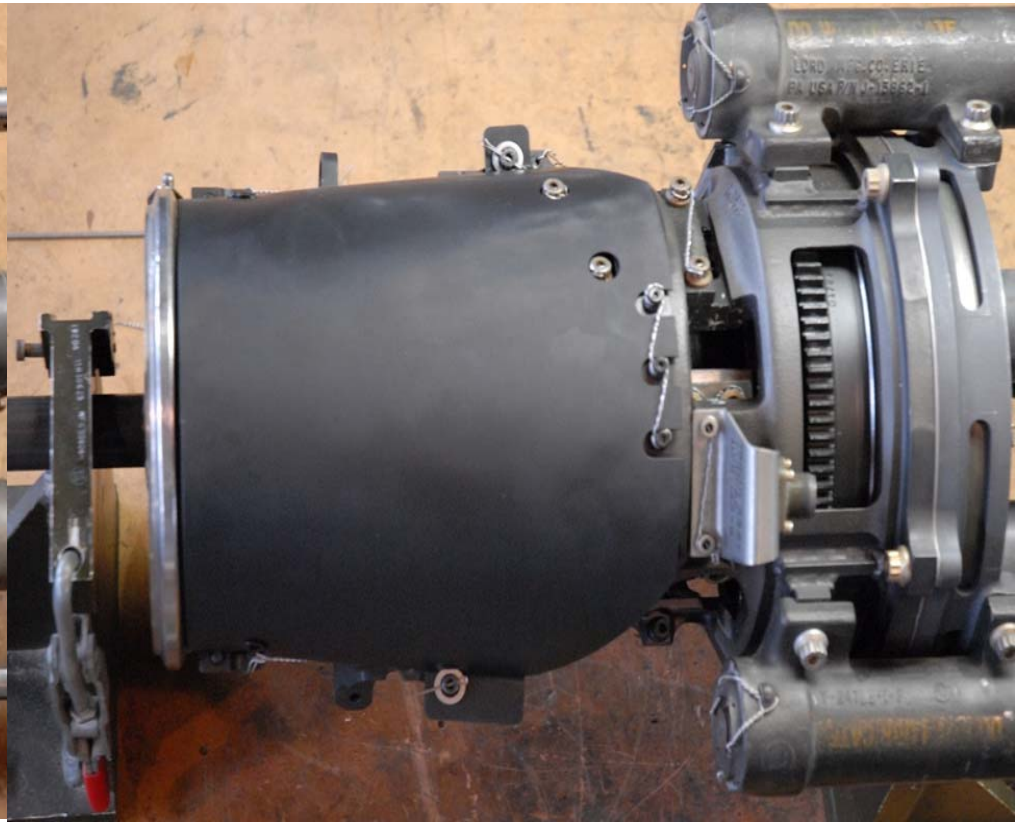
ROTOR COVER

ROTOR COVER

- Rotor Cover mounts in the Main Bearing such that the holes in the cover are aligned with the barrel holes in the Rotor.
- The Cover is attached with 12 Bolts and 12 washers
- The Bolts are torqued to 250 - 300 in-lbs.

HOUSING COVER





HOUSING COVER

- Forward top mounts under Unlocking Cam safety wire.
- Forward sides mount over Gun Housing Bolts, retained by a washer and cotter pin.
- Aft sides are safety wired to aft Gun Housing alignment roll pins.
- Shield is flush with Gun End Plate Clamp.
- Fits all types of Gun Housings.

DRIVE MOTOR COVER

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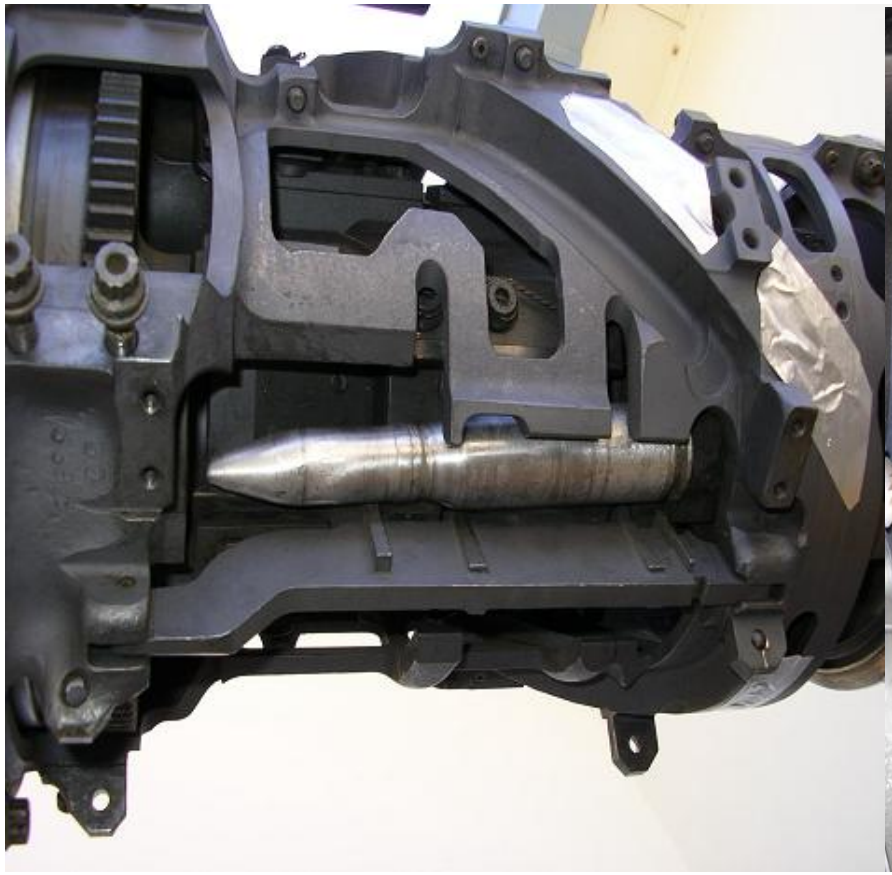

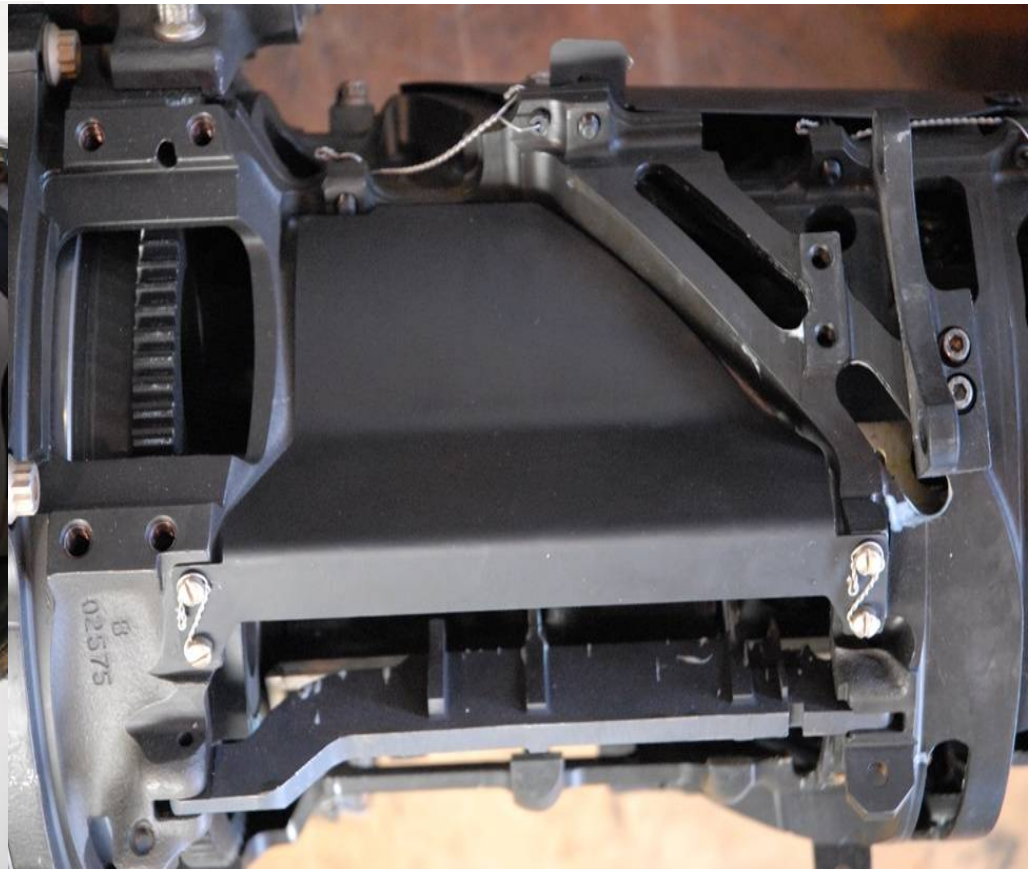

DRIVE MOTOR COVER

- Mounts under Drive Motor.
- Uses four screws and pre-existing unused threaded holes in Gun Housing.
- Molds against side of Gun Housing.
- Provides half inch of clearance for ejection of brass and live rounds.

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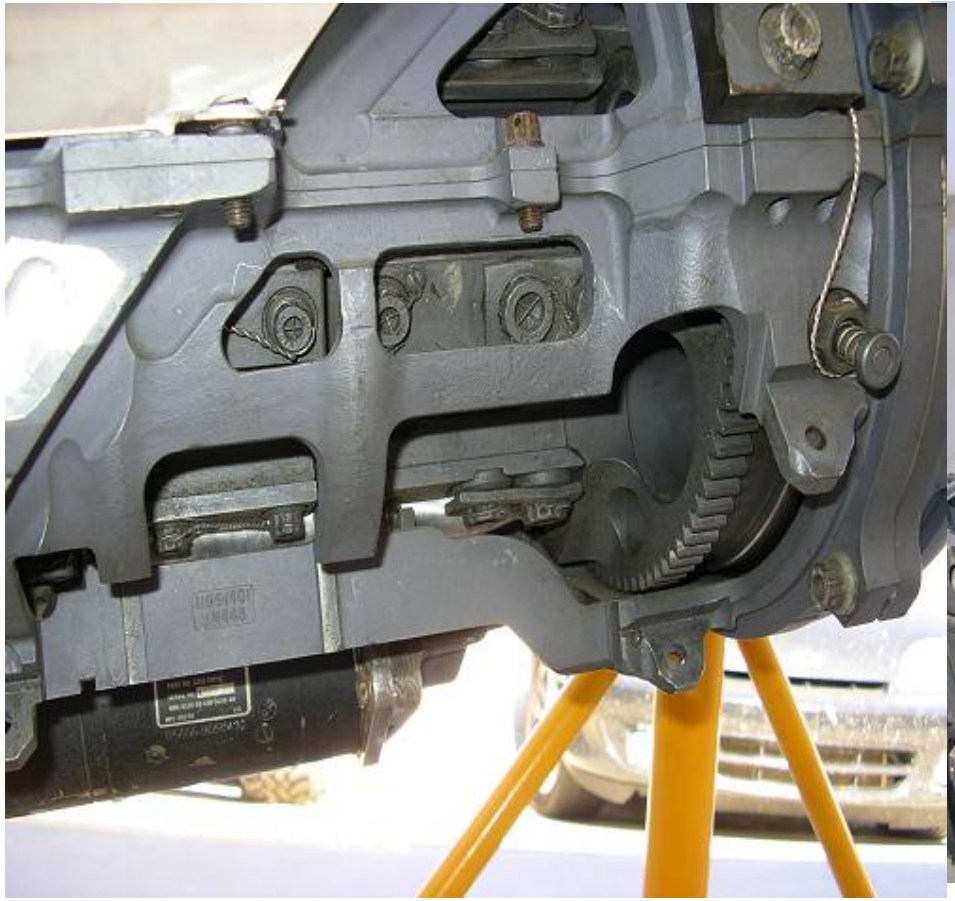
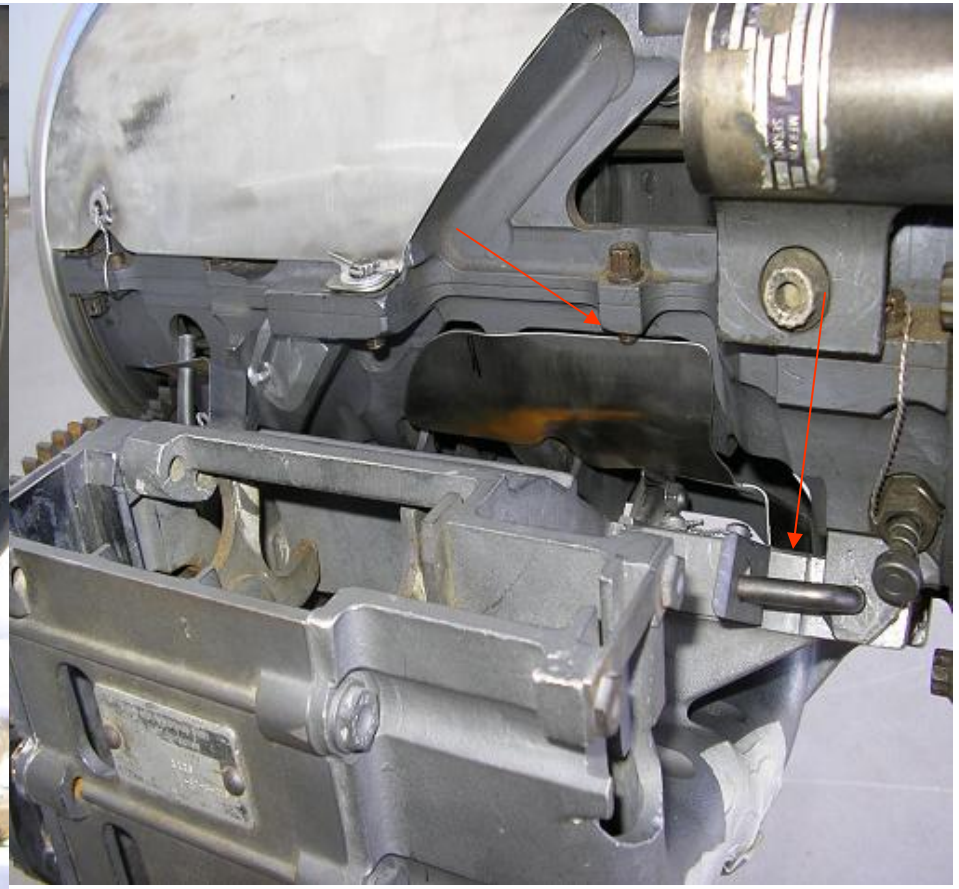
FEEDER COVER





FEEDER COVER

- Mounts to the Feeder using forward Mount Pin and Feeder Round Guide screw.
- Covers bottom of Gun Rotor Assembly.
- Extends upward and molded to cover side of Gun Housing.
- Grooved to clear the Feeder Sprocket.
- Does not interfere with ammunition feeding.

M197 BLADE TAPE

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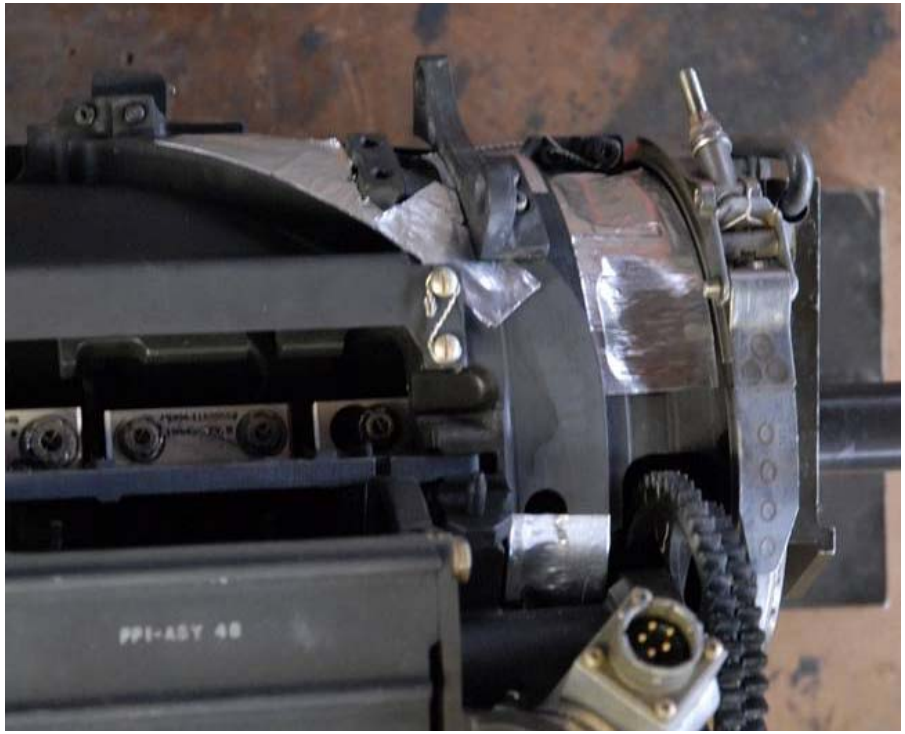

M197 BLADE TAPE

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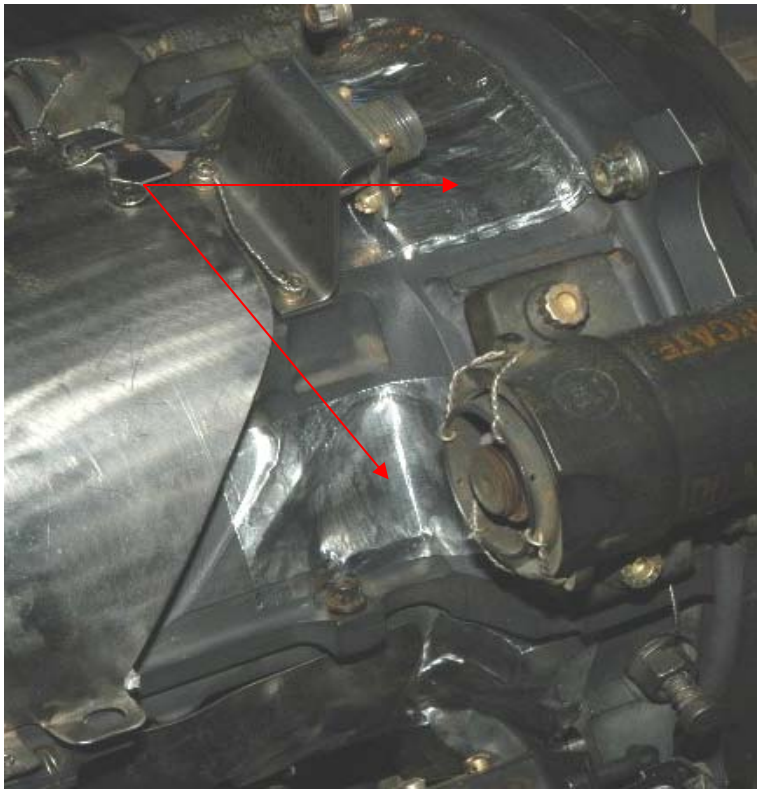

M197 BLADE TAPE

- Cut pieces to size, cover openings on lower Housing Assembly Elliptical Cam Path.
- Leave gap on bottom Elliptical Cam Path opening to allow lubrication and drainage.
- Cut pieces to size, cover lower Housing Assembly Clearing Cam Path.
- Placed tape over the opening above the main bearing, beneath the electrical contact and other unprotected areas on the upper housing.
- The opening between the feeder shield and the lower housing should be covered with tape.

M89 BLADE TAPE

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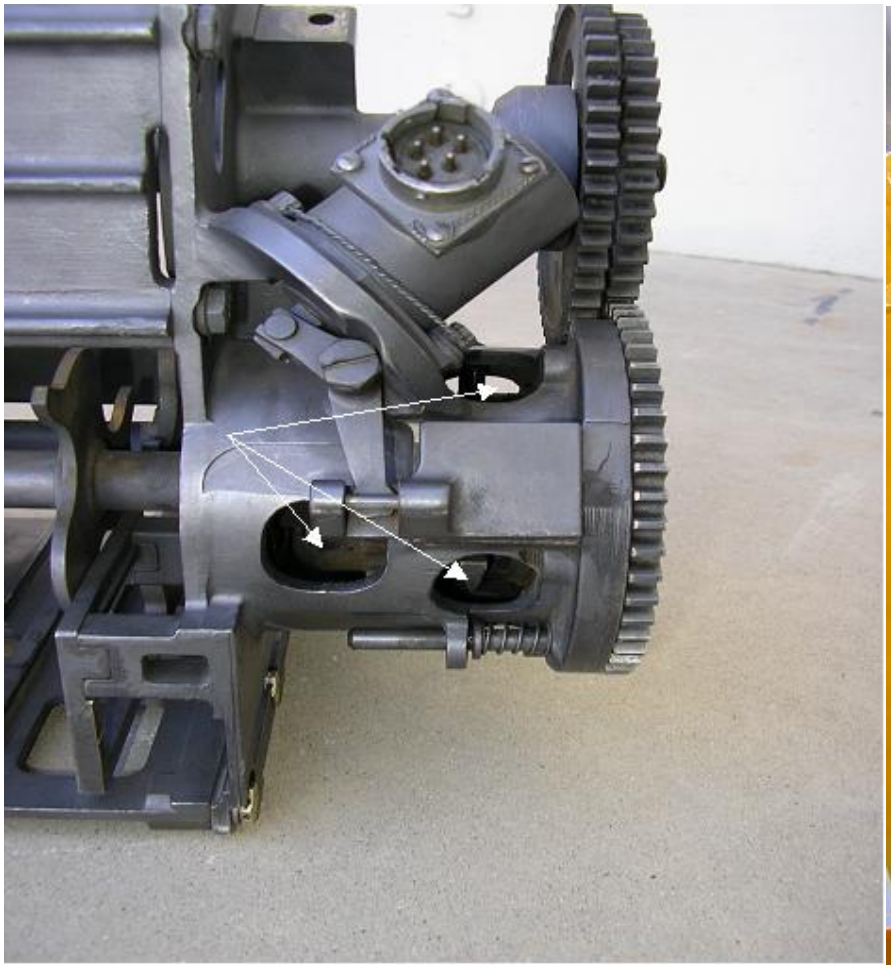

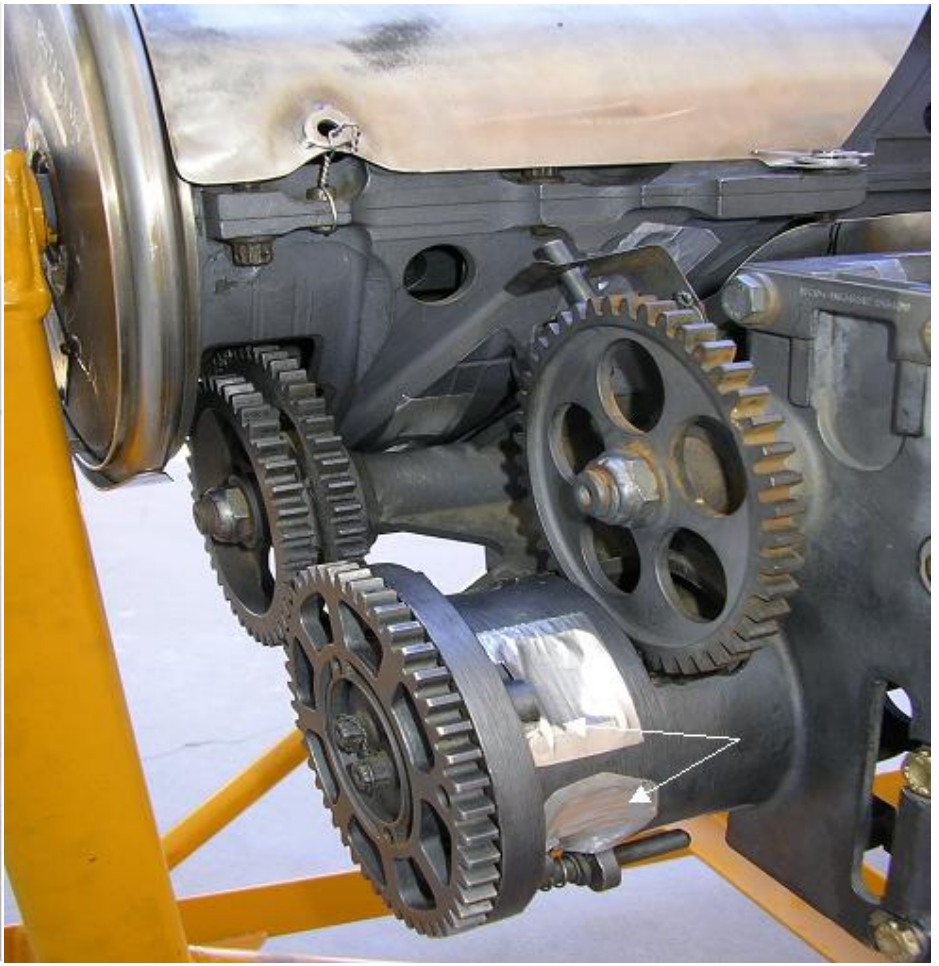

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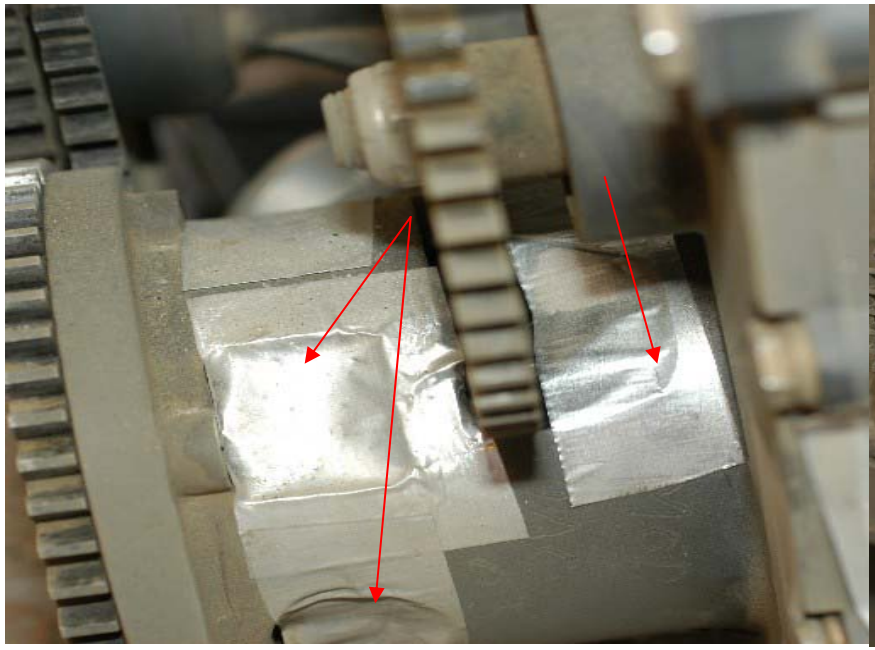

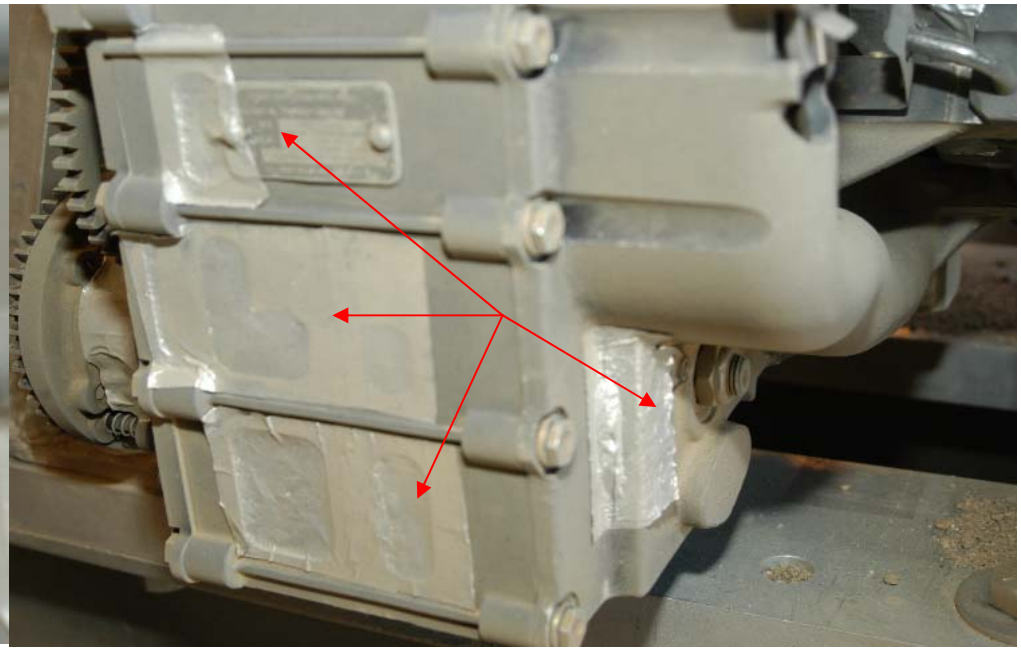

M89 BLADE TAPE

- Six pieces, cut 1¼ square inch, covers six openings on Feeder Clutch Housing.
- A strip of tape should be placed behind the stripper gear on the clutch.
  - Covers critical Rotating Vane and Clutch Actuator that controls ammunition feeding to the Gun.
- Blade tape should be used on all openings on the back and side of the feeder.

BTL TESTING

- Sand and Dust Testing
  - Mil-Std-810
  - Schmidt 3.5 cu ft Sand Blaster at ~8 ft from Housing
    - >150 µm silica sand blown at 900 cfm with a concentration of up to 50 g/ft^3
    - Sand Blast environment was considered more harsh than reality
  - Dusted by hand prior to firing and from stand during firing
  - Thermocouple data taken
  - 500 baseline rounds, 1100 sand and dust rounds

BTL TESTING

Sand and Dust Results

- No temperature increase
- Dust related Jams reduced:
  - Single race bearing and seals
  - Additional Blade Tape

BTL TESTING

- Cold Test
  - Mil-Std-810
  - Low Temp Test (-50 deg F)
  - 24 hour soak
  - No adverse effect, 100 rnds fired
- Salt Fog
  - Mil-Std-810
  - 5% Salt Solution for 350 hrs including wet and dry cycles
  - Post rinse with deionized water
  - Minor gun maintenance followed by 100 rnds fired

FLIGHT TEST

- China Lake (VX-9)
  - 2 Flight days attempted firing appx. 180 rounds in dust conditions
  - Gun jammed; unrelated to Kit performance
- Yuma (MAWTS-1)
  - 2 Kits tested (1400 and 1100 Rounds)
  - Daily FARP and Dust conditions
  - Kitted Guns survived Sand Storm (Brown out) that incapacitated non-kitted guns

PRODUCTION

- ECP
  - First Article: 50 Kits, 10 Spares and 5 Trainers
  - Cost: ~$650/Kit
  - Production Drawings
- Manufacturing
  - 304 Stainless Steel Sheet w/ Black Oxide Finish
  - Hydroform For Housing Cover and Motor Cover
  - Stamping for Rotor Cover
  - Bending for Feeder Cover

SUMMARY

- The AH-1W Gun System is the ultimate defense for Aircrew flying combat missions. When operable, the system has multiple uses and is extremely deadly. The Environmental Kit will significantly increase the AH-1W Gun System reliability and reduce maintenance hours by decreasing Gun and Feeder jams caused by rock, dirt and sand intrusion.

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QUESTIONS?

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