GENERAL DYNAMICS

Armament and Technical Products

GAU-19/A Barrel Life Study

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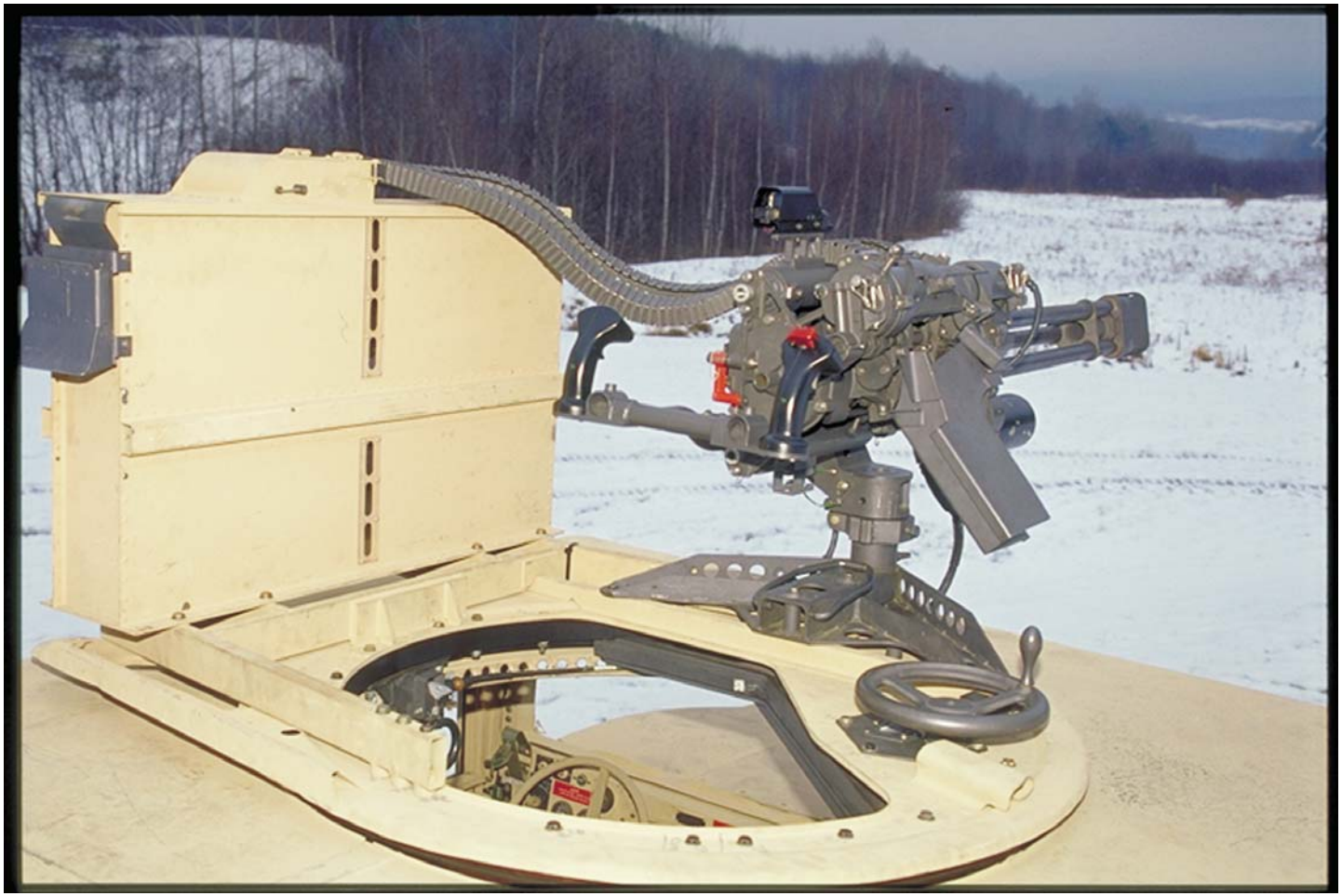
GAU-19/A Barrel Life Study Agenda

- GAU-19/A Description
- Barrel Design Parameters
- Customer Background
- Barrels Used in the Study
- Barrel Inspection & Results
- Barrel Testing & Results
- Conclusion

GAU-19/A Barrel Life Study
GAU-19/A Description

- Three-barrel 12.7mm externally powered Gatling gun
- Provides lightweight, lethal firepower to a variety of platforms:
  - Helicopters
  - Ground vehicles
  - Naval vessels
  - High speed patrol boats
  - Fixed Wing Aircraft

GAU-19/A Barrel Life Study
GAU-19/A Description



GAU-19/A Barrel Life Study
GAU-19/A Description

- Rate of Fire — 1000/2000 spm (1,300 spm HMMWV)
- Effective Range — 1800 Meters
- Maximum Range — 6000 Meters
- Max Dispersion — 5 mrads (80 % circle) = 5m at 1000m
- Weight — 138 Lbs (gun & feeder assembly)
- Reliability — 40,000 MRBF
- Average Recoil — 600 Lbs at 2000 SPM
- Maintenance — 30,000 rds.
- Barrel replacement — 50,000 rds. per set
- Sighting — Holographic, NVG compatible, Laser Pointer
- Uses entire range of .50 cal NATO / Mil Spec ammunition

GAU-19/A Barrel Life Study
Initial Barrel Design Parameters

- Crack Propagation Program utilized for barrel analysis
- Each barrel set must be capable of firing out a complete ammunition container load
- Target life expectancy of 35000 rounds per set used in analysis program

GAU-19/A Barrel Life Study
Barrel Physical Description

- Mat'l: CrMoV steel per A10505
- Bore: Chrome plated per A10374
- Exterior Finish: Solid Film Lubricant 119A2115
- 12.69 mm bore/12.98 mm groove diameter
- 8 land rifling: right-hand constant twist 1 turn in 30 calibers

GAU-19/A Barrel Life Study
Customer Background

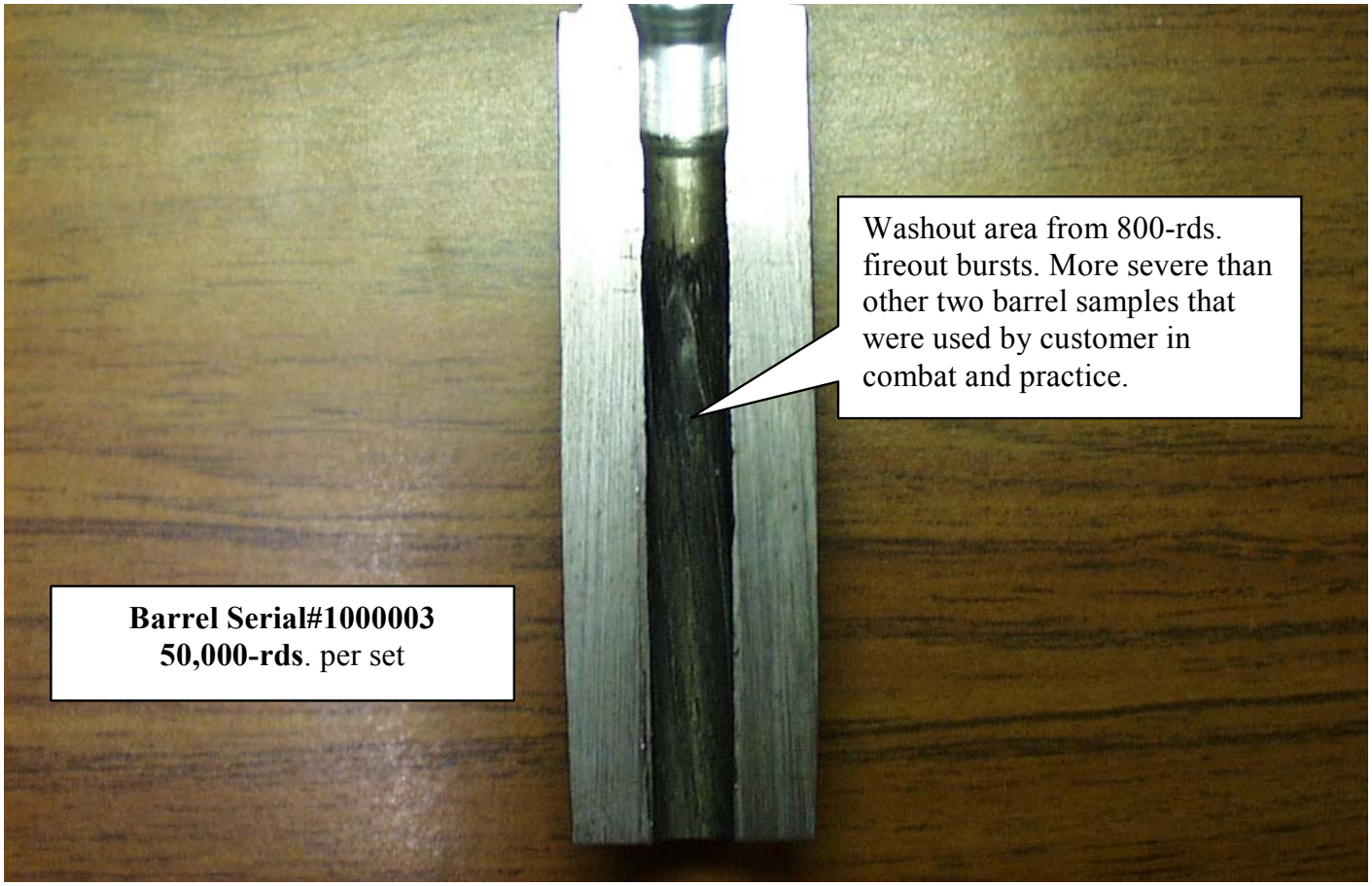
GAU-19/A Barrel Life Study
Barrels Used in Study

- Barrel sets from customers with 35,000 to 54,000 rounds
  - Typical firing cycles of 50 to 100 rounds
  - API ammunition
- Barrel set from GDATP with 50,000 rounds
  - Ten 800 round bursts with all others at 200 to 400 rounds
  - M33 Ball and M17 Tracer, 4:1

GAU-19/A Barrel Life Study Parameters Measured

- Inspection
  - ↗ Erosion
    - Indicator of velocity reduction
  - ↗ Crack Depth
    - Indicator of rounds to failure
- Test
  - ↗ Velocity
    - Indicator of barrel performance and resultant targeting

GAU-19/A Barrel Life Study
Parameters Measured – Barrel Erosion



GAU-19/A Barrel Life Study
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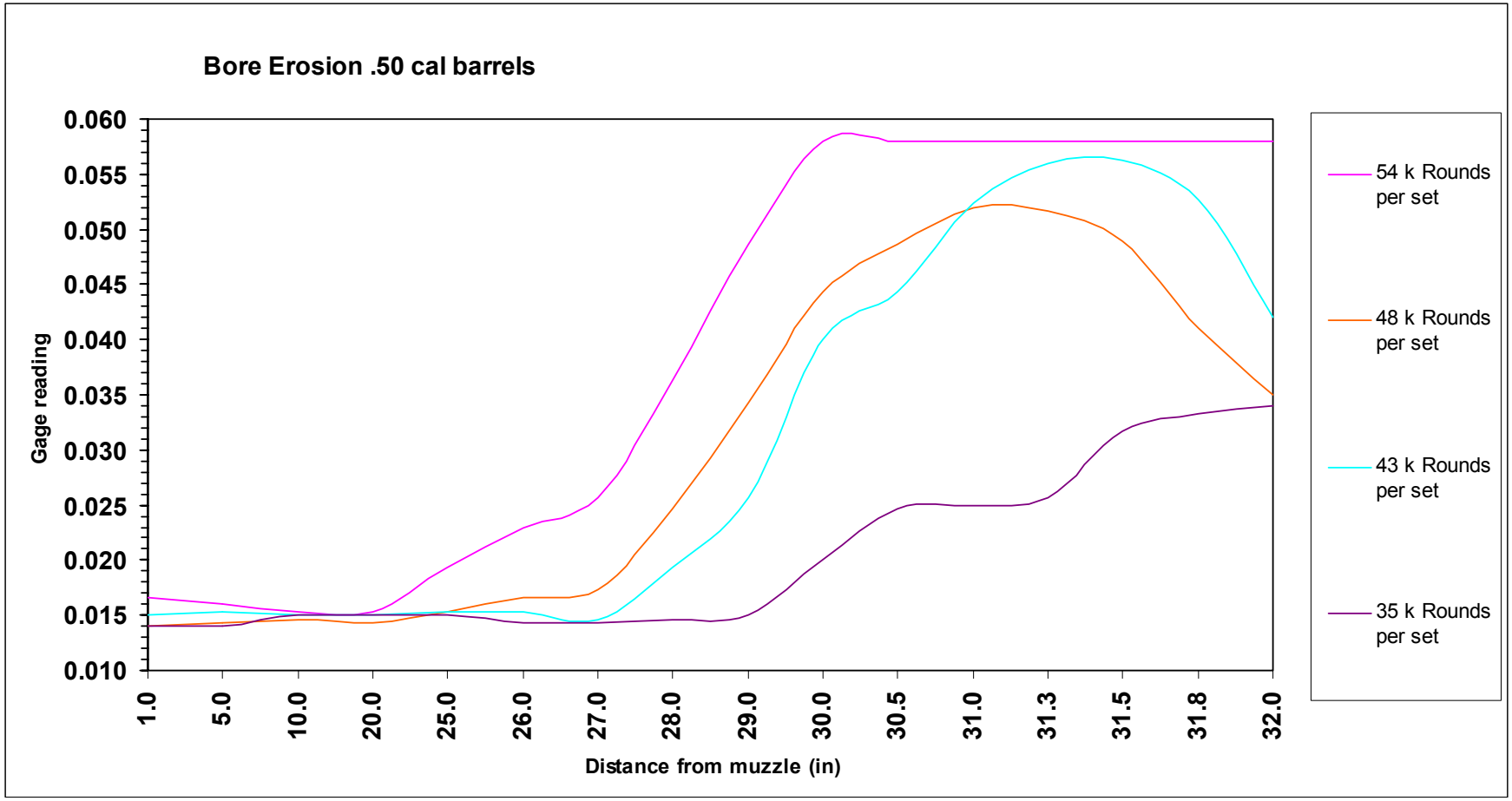
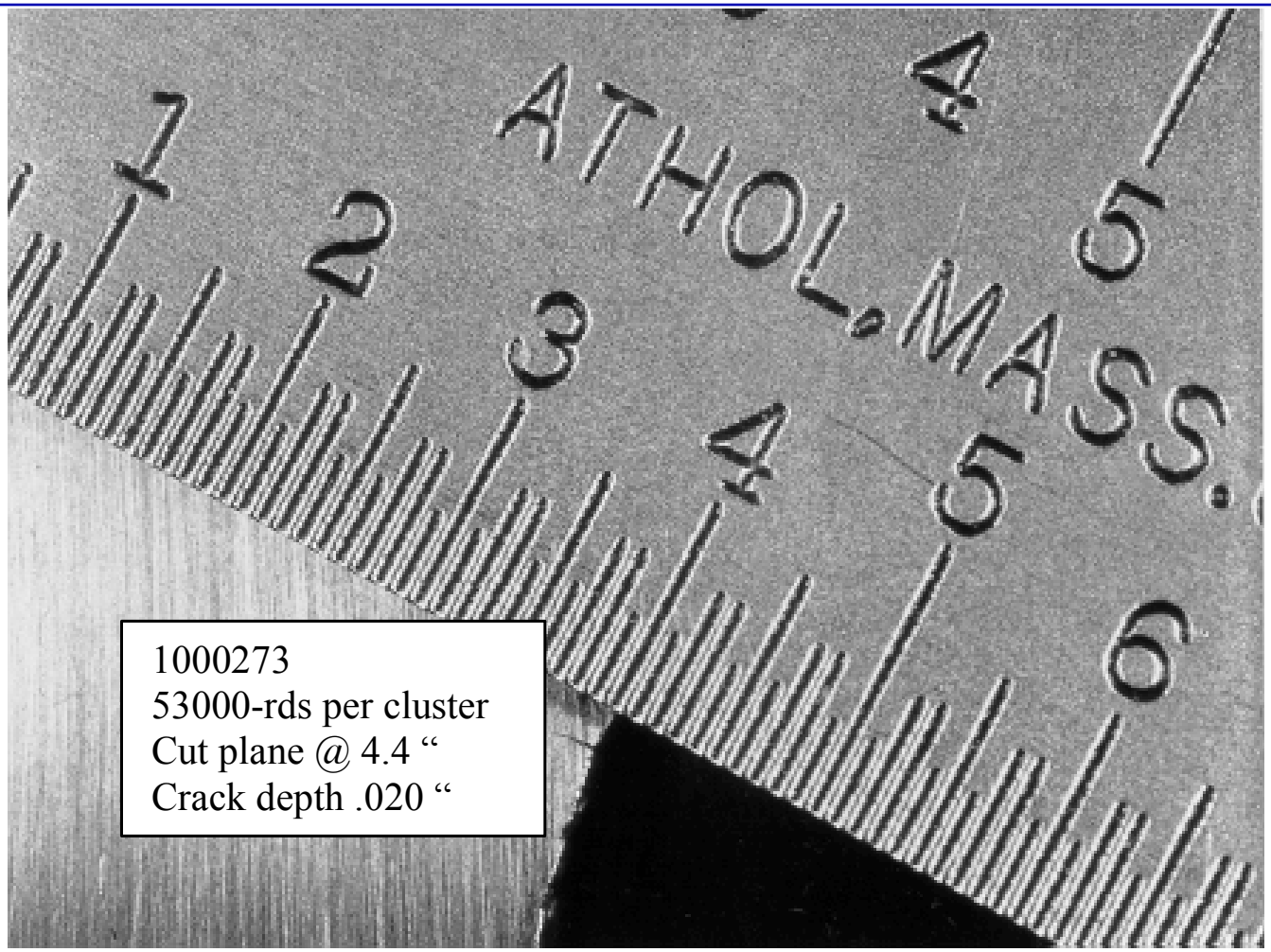
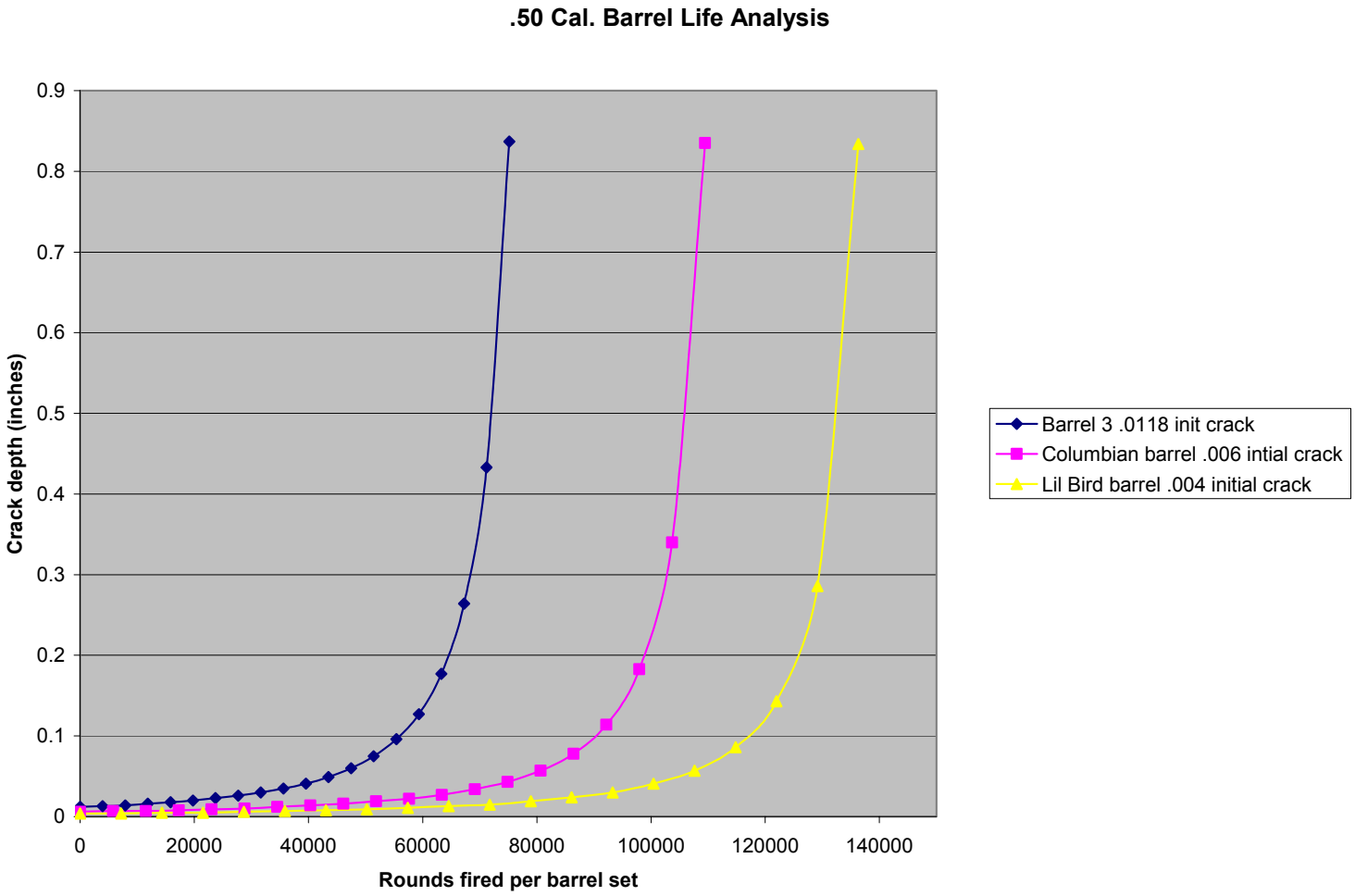


GAU-19/A Barrel Life Study
Parameters Measured – Crack Propagation



GAU-19/A Barrel Life Study
Parameters Measured – Crack Propagation



GAU-19/A Barrel Life Study Parameters Measured - Velocity

ROUNDS AS RECEIVED (per barrel cluster)	VELOCITY (ft./sec.)	YAW RESULTS
4000	2800	No yaw
43250	2680	No yaw
45200	2655	No yaw
48405	2565	Two minor yaws, tracer only
53000	2210	Yaw present, tracer only
54000	2150	Yaw present, tracer only

GAU-19/A Barrel Life Study Conclusion

- At approximately 50,000 rounds
  - Significant velocity change
  - Yawing begins to occur in tracers affecting targeting
  - No danger of crack propagation causing failure
- BARREL REPLACEMENT PER ROUNDS FIRED CAN BE INCREASED FROM 35000 TO 50000 ROUNDS PER SET