

11-14-80
JWBrooks:T

MODEL 870 COMPETITION TRAP

Research is continuing to help process when questions arise. We will continue to drill gas cylinder and barrel guide ring locating pin holes until plant tooling arrives early next year.

Process is still planning on assembling guns in November for Trial & Pilot.

DUCKS UNLIMITED

All drawings for the commemorative and "DU Special" guns have been transmitted. ~~DU Special rollmark drawings were transmitted 11-13-80.~~ The Commemorative rollmark drawings were transmitted 11-14-80. We are still waiting for a sample of the new size emblem from Marketing to test. It is due this week.

MODEL 870 - 20 Ga. LW LIMITED

We have nothing to report.

MODEL 1100 LINK BREAKAGE

Broken parts from the Grand American trap shoot were received from Chem & Met. Phil Johnson felt they were fatigue failures.

Sample parts were sent to Bob Freed at the Materials and Machine Dynamics Engineering Technology Laboratory. He has checked several parts using optical metallography and scanning electron microscopy. He has concluded that:

- The 1018 steel is through carburized. The microstructure consists of tempered martensite and ferrite.
- Fracture in these samples occurred by the same general mechanism; i.e. fatigue-initiated crack propagation followed by an overload failure.

• Fatigue is low cycle. Possibly a cycle corresponds to the occasional firing of a very powerful round.

He recommends the following:

- Redesign part geometry to reduce mechanical stress on the link.
- Reduce surface roughness to eliminate nucleation sites for fatigue cracks.
- Improve fatigue resistance of this link design by surface shot peening or nitriding.

We presently have a design with increased cross sectional area at the main points of breakage. This design is out to a vendor for cost for sample parts. Shot peening will be investigated for present parts.

MODEL 552 LONG RIFLE

An investigation is being made to see if the present Model 552 rifle can be made to function with long rifle ammunition only. With 4.5 ounces added to the action bar a rifle has been made to function with long rifle ammunition only, with short and longs occasionally ejecting but not feeding up or cocking the hammer. Further work is being done to see how much weight can be added before long rifle ammunition will fail to function the rifle.

Along with this testing we were asked to see if a rifle that failed a long rifle round would function satisfactorily with the above weights added to the action bar. Eleven rifles received from the plant that had blown proof rounds were tested using long rifle high velocity ammunition. (One of the rifles that was used to develop

the weighted action bar failed a long rifle high velocity round after approximately 400 rds. with 3.2 of weight on the action bar.) Another of the rifles failed a head as received during a fifty round test. It will be shot with the weighted action bar.

Three rifles were received from the Bridgeport Ballistics Unit that had over 10,000 rounds each, and were reported to be failing an occasional long rifle high velocity round. Testing here did not give failed heads but cases did swell below the head. Tests were run with the weighted action bar with no failed heads and the swelling of the cases was the same as without the weighted action bar.