Model 710 Receiver Insert Non-DAT Testing

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PURPOSE

The purpose of this test was to examine the robustness of the Remington Model 710 receiver insert during conditions of extreme abuse. The first test evaluated the tendency of the receiver insert to deform when placed in a high-temperature, high-humidity environment. The second test evaluated deformation over 10,000+ cycles of sear loading.

CONCLUSIONS

No significant longevity deficiencies were found. The ANSYS model showed stresses well below the limits of the material used in the receiver insert. The creep test revealed no significant movement of the firing pin head once the fixture reached the temperature of its chamber. The first receiver insert fatigue test showed an unexpected increase in firing pin head protrusion as the number of cycles on the insert increased. This was attributed to error caused by an inconsistent measurement technique. In the second fatigue test, care was taken to align the firing pin head before measuring. During this retest, all measurements fell within a 0.005 inch wide band. When the test was concluded, none of the gun's components showed extreme wear.

PROCEDURE

ANSYS analysis. An analysis was performed in ANSYS to determine stress levels in the receiver insert. In this analysis, it was assumed that the steel side plate and the steel pins in the plate did not deform significantly relative to the plastic receiver insert. Three steps were used in the analysis.

First, a simplified ANSYS model of the receiver insert was created. It was meshed and a stress was placed on one of the holes in the receiver insert that mated with the metal side plate. The result of this analysis was used to determine stiffness, both vertically and horizontally, for that hole. The analysis was then repeated for all the holes in the receiver insert that mated with the side plate.

An ADAMS model of the side plate was created. The holes were attached to springs whose stiffness values had been derived from the ANSYS analysis. The plate was loaded with a force equivalent to the force of the firing pin head on the sear. When the analysis was run, the plate quickly achieved equilibrium. The forces at each hole were taken from this analysis.