

Subject: M/710 Production Review -- Plant visit to review M/710 production.

In general, the product that was reviewed on Thursday was encouraging. It appears that the components and assembly procedures have stabilized, producing consistently functional and cosmetically uniform firearms. Although the primary intent of the visit was to review components for conformance to design intent, the primary result of the visit was procedural enhancements to improve product flow.

The review began with discussions with Joe and Matt regarding component issues that affect performance or assembly. Out of that discussion, the main issue noted from both performance and assembly aspects was the stock and bolt stop interaction. A significant number of stocks are scrapped due to insufficient bolt stop retention forces. The current procedure requires secondary manual "crimping" of the bolt stop ribs to produce the desired interference with the bolt stop. The manual crimping operation is operator sensitive and inconsistent. As an intermediate step the stock tool has been altered to eliminate the manual crimping, but due to assembly tolerances the change will not completely eliminate the potential for insufficient bolt stop retention forces. The proper correction will involve the implementation of the bolt stop spring. The bolt stop spring drawing has been forwarded to vendors for production quoting and startup. Implementation of the bolt stop spring will require core changes to the stock tool as well. Coordination of the stock changes and bolt stop spring production will be required.

The following are minor component or procedural issues discussed with their respective action noted.

Stock: (Other than bolt stop issue discussed above)

- Middle take down screw torque -- If torqued above 45 in-lbs, the screw head will burrow into the stock. The material thickness around the middle screw hole will be significantly increased to provide more support for the screw head. The tool change will occur coincident with the bolt stop spring core changes.
- Slight flash (excess material) is present in latch opening. Currently does not impede latch movement but if amount of flash increases, it will eventually affect latch movement. Mayfield to review with molder, tool corrections could be completed with bolt stop spring core changes.

Final Assembly Process: (Notes regarding component fits and assembly procedures)

- A request was made to eliminate the requirement for Sear Lift inspection. Due to the design and assembly procedures of the receiver insert assembly, the sear lift is a built-in feature not adjustable. The assemblers noted the consistency and indicated significant time is required to complete the inspection. It is my opinion that this operation can be eliminated, will request a further review with management.

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- Another time consuming operation previously required was the application of Loctite to the top scope ring screws. The assemblers were applying a Loctite thread sealer to the four screws that clamp the top scope ring to the bottom ring. This procedure was eliminated in belief that the consumer will have to loosen the screws to adjust the scope position for their preferred eye relief anyway, thus breaking the Loctite bond.
- An inspection that was developed based on issues during Trial and Pilot testing required the assembler to ensure the sear was free to move prior to assembling the bolt into the firearm. As a review, we discussed the current assemblies and frequency of issues relative to friction against the sears. It has become apparent to the assemblers that the interference between the sear and receiver insert assembly was partially caused during the receiver insert assembly. They have corrected the issue with the receiver insert assembly procedure and subsequently have not had trouble with sear interference. Another contributing factor to sear interference was due to varying receiver insert support screw hole locations. Current receivers provide consistent receiver insert support screw hole locations, which have eliminated any biasing of the receiver insert assembly when assembled to the receiver. The inspection for free sear travel will continue, but wanted to note the lack of issue with this at the current time.
- A comment was made by the assemblers regarding the high consumption rate of dummy rounds. Discussing the subject of dummy rounds and their usage evolved into a question of purpose and requirement for cycling dummies through the action. The net shape manufacturing processes used for the magazine box assembly, stock and latching mechanism provide a consistent relationship of those components when assembled into a complete firearm. Due to the consistency of the components, if an issue arises with feeding performance it will be obvious and common across that specific lot of errant components. Therefore, since we have established an excellent feeding performance baseline to date, elimination of action cycling inspection at the assembly bench is acceptable. The action cycling performance will continue to be verified during proof and accuracy testing.

Gallery Testing

- During observation of the gallery testing a slight deformation of triggers was noted. Inspection of the test jack revealed that the cable used to actually pull the trigger was bound around the activation cylinder. This binding caused the tension in the cable to be too high, imparting a higher than required force to the trigger during firing. Correction of the cable routing and connection eliminated the binding. Subsequent firearms tested did not show signs of trigger deformation.

Final Inspect and Pack

- The final step was to review the cosmetics of the final product prior to packing. Action finishes were very uniform and consistent from firearm to firearm. The stock fit to action was fairly consistent, within Trial and Pilot expectations. The sidewall sink of the stock was present, noticeable but not exaggerated. Trigger position relative to the clearance in the stock was fairly centered and consistent. The rack talker label stood out but looked good. Hand tags and ISS keys were present.

As stated in the initial paragraph, overall I was pleased/impressed at the level of consistency in components and completed firearms, as well as current build rates. Ramp-up issues seem to have been minimized. During review of my notes with the Mayfield Staff prior to my departure, the topic of bolt camming and sliding forces was discussed. Although the current production bolt assemblies cammed fairly reasonable, improved camming will be a resultant of implementation of the next generation of bolt heads, probably beginning in early February. Bolt sliding forces remain higher than desired and will be addressed in a couple of ways. The current bolt bodies as supplied by the vendor are running on the maximum acceptable diameter. The subsequent glass beading operation slightly increases the outside diameter as well, while also roughening the surface. The combination of slightly oversized bolt bodies and the rough surface are the contributing factors to the "tight" feel of the bolt assembly in the action. The vendor has been instructed to reduce the nominal diameter to mean model drawing. Mayfield will investigate elimination of the glass beading operation. Although originally specified as a cosmetic operation, it does cleanse the surfaces of brazing residue prior to coloring. If the brazing residue can be eliminated without the glass beading operation, the bolt bodies could be produced with a smooth surface which would significantly reduce the sliding forces.