Commentary on Adding the Blocker to the Current Production Trigger Assembly

While the SPL trigger assembly may look and act like the current production trigger assembly, the resemblance is only a little more than superficial – the parts from the SPL safety/blocking system are not directly portable to the current trigger assembly. Ilion's proposal to add the SPL safety/blocker system to the current trigger assembly design is an interesting idea that, with some changes and refinement, may be feasible. But, to just add the SPL blocker system parts to the current trigger assembly without a redesign of the blocker and several other components is not possible. The issues that must be addressed in making this change are outlined below.

Issues:

SPL safety and blocker would require complete redesign

The kinematics of the SPL safety/blocker mechanism are optimized for the components used and their locations with respect to each other in the SPL trigger assembly. This is a case of where the SPL and current trigger assembly designs are superficially similar – not only are the parts different in size and shape between the SPL and the current system, the relationship of the parts with respect to each other are quite different as well. To use the SPL safety blocker mechanism on the current trigger assembly would require a complete redesign of the safety/blocker mechanism to work as intended. In summary, while the concept of the SPL safety/blocker system is portable to the current trigger assembly, the SPL parts themselves are not.

Safety stop surfaces on rear spacer block

One of the less obvious functions of the SPL trigger housing is that the rear spacer block's top surfaces serve as the stop for the safety in the SAFE and FIRE positions. The locations of the stop surfaces on the rear spacer block are integral to the kinematics of the safety/blocker system mechanism. To ensure proper function of the safety/blocker mechanism, the SPL safety, the current trigger assembly's rear spacer block, or both would need to be redesigned.

Sear bias spring location

The SPL trigger assembly design required moving the sear spring and its support upward, and lowering the front spacer block to give the blocker room to operate inside the trigger housing while providing easy access to the blocker adjustment screw in the blocker after assembly. While it may be possible to use the current sear/safety cam and move the sear spring support from the top of the front spacer block, the motion requirements of the sear/safety cam and the space available for the sear spring make this an extremely difficult problem to solve. Folding a sear spring support shelf from one or both side plates creates asymmetry between the right and left hand side plates (i.e. they are no longer a common part). This in turn defeats one of the primary reasons for going with stamped side plates: both parts are not made in the same die set, thus permitting more variation in hole position between the assembled side plates.

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Conflict between front spacer block rivet and blocker hold down stud

The blocker hold down stud is important to the proper operation of the blocker system on the SPL. The blocker hold down stud prevents the deflection and twisting of the blocker so that a force applied to the trigger cannot overcome the blocking action of the blocker. To ensure the security of the blocker hold down stud, it is press fit into the front spacer of the trigger housing. On the current trigger housing, two rivets are used in each spacer block to secure the side plates and to prevent rotation of the spacer blocks in the trigger housing once assembled. The blocker hold down stud is in the same approximate location as the second rivet used in the front spacer of the current trigger housing. Removing this rivet to permit the use of the blocker hold down stud would require some type of mating feature between the front spacer block and the side plates to prevent undesired motion (rotation and translation) of the front spacer block in the trigger housing.

Trigger/connector not balanced

The trigger in the SPL is a balanced design, which is important to SAAMI Jar-Off performance. The nominal eccentricity of the center of gravity (CG) with respect to the axis of the SPL trigger pivot hole is 0.00007" (for all practical purposes 0). The eccentricity of the current trigger assembly trigger/connector CG is 0.118" from the axis of the trigger pivot hole.

Regain

The SPL trigger assembly has been designed and tested to regain at a trigger pull of 3½ lbs. The current trigger assembly will not consistently regain at that trigger pull force level and would require a higher minimum trigger pull force setting than the SPL.

Sear shape

The cross-sectional shape of the SPL sear is dog-boned as a concession to the MIM manufacturing process. The dog-bone shape also has the added benefit in that it does not provide a large area to support a film of congealing lubricant between the side of the sear and the side plates of the trigger housing. In addition, the side cavities in the sear provide relief for debris that could accumulate between the sear and side plate, decreasing the possibility of the debris impeding the function of the sear.

Sear retention feature of the SPL given up

One of the novel features provided by the SPL trigger housing is retention of the sear and sear spring without slave pins when the trigger assembly is not in the action. On the current trigger assembly, the sear and sear spring are free to exit the trigger housing and be lost if slave pins are not used. Installation of the trigger assembly into the action is simplified not only in production, but especially in the field where slave pins are generally not available.

Summary:

In summary, while the concept of the SPL blocker is portable to the current trigger assembly design, the SPL parts themselves are not. To port the safety/blocker design to

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the current trigger assembly would require a complete redesign of the safety/blocker system as well as a good number of the components of the current trigger assembly to even work, which would likely negate any savings associated with this approach. The improved performance of the SPL trigger assembly (lower permissible trigger pull forces, lower SAAMI Jar Off sensitivity) would also have to be forgone if the SPL safety/blocker concept were to be implemented on the current trigger assembly. Finally, all testing (EET and DAT) would have to be repeated with a likely increase in the risk of failure.

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