

***Model 770 Fire Control*****Background:**

With the implementation of the X-mark Pro fire control on all new bolt action rifles in Ilion it was decided that a similar fire control was necessary on the Model 770. It was, however, estimated that putting the X-Mark Pro fire control on the Model 770 would add \$20.00 to the cost of the gun. This kind of cost increase on an entry level rifle was not acceptable. The conclusion was to design a new fire control for the Model 770 that incorporated the safety features of the X-Mark Pro without the added cost.

**Design:**

The new fire control was to be similar in concept to the X-Mark Pro with a trigger block/return safety that could be used in the current plastic receiver insert.

The design objectives were as follows:

- Design a less expensive alternative to the X-Mark Pro with little to no impact on manufacturing cost
- Block trigger when gun is in safe
- Return trigger to minimum engagement when moved from fire to safe
- Remove the connector

To achieve the objectives we designed with the following approach:

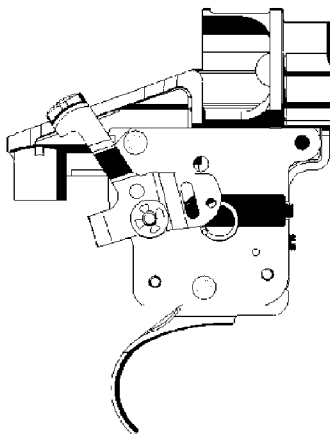
- Add as few new parts as possible
  - Total part count is unchanged
- Keep the concept of the plastic receiver insert
- Utilize a proven safety design
  - Variation of the X-Mark Pro safety arm
  - Provide adjustable translating trigger block

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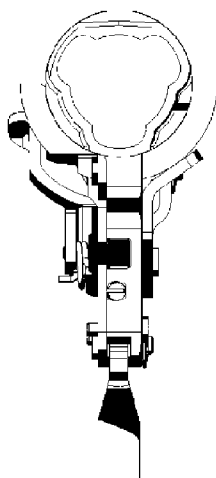
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The design efforts yielded the following fire control:



The dark blue part is the translating trigger block that moves back and forth with the operation of the safety arm. There is an adjustment screw that sets allowable trigger motion on safe to a minimum level.



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The design resulted in the following part changes in the fire control:

- New Parts
  - Receiver Insert
  - Side Plate
  - Trigger
  - Trigger Block
  - Safety Arm
  - Trigger Block Screw
  - Safety Detent Spring (X-Mark Pro)
  - Safety Pivot Pin
  - Engagement Screw
- Obsolete Parts
  - Over Travel Screw
  - Connector

These new parts required the following tooling:

- Receiver Insert
  - New injection molding tool
- Side Plate
  - New stamping tool
- Trigger and Trigger Block
  - New MIM tool required for both
- Safety Arm
  - New stamping tool

Cost estimates on the parts for the new fire control put the total cost for the assembly at roughly the same cost as the current Model 770 fire control. This includes assembly and overhead cost.

Testing through DAT concluded that the new design met all of our design goals and objectives. Performance was on par with the current fire control and no issues with the function of the design were discovered.

**Schedule:**

The project began in the 4<sup>th</sup> quarter of 2006 with some initial concepts to achieve our design objectives. The following milestones with corresponding dates are as follows:

- Prove out concept using rapid prototypes (2 guns)
  - Complete – January 9, 2007
- EET (3 guns)
  - Complete – June 8, 2007
- DAT (20 Guns)
  - Completed November 16
  - 20 Model 770's tested
    - Function testing of 10 Model 770's in 30-06
    - Drop testing of 5 each .243 WIN and 7mm REM MAG

Currently, the Mayfield plant has submitted a CAR for this project and they are waiting for the CAR to be approved. Once approved then the production tooling will be ordered. The remaining project schedule is as follows:

- Order Production Tooling
  - March 7, 2008
- Production Tooling Complete
  - July, 2008
- T&P
  - August - September, 2008

Providing successful completion of T&P this schedule has us shipping Model 770's with the new fire control in the 4<sup>th</sup> quarter, 2008.