Analyzing a trigger system

Where goes the energy that is put into a double action trigger system by pulling the trigger? A standard test of a Smith & Wesson Revolver shows us that the amount of 415 Nmm as energy is necessary to actuate the double action trigger. Now remove one friction or energy consuming part after the other and test the system again and again. The next part we remove on the Smith & Wesson revolver for the test is the safety bar. Test the firearm tem times to establish a consistent result. On our revolver the required energy is 410 Nmm, so the difference to the complete firearm is 5 Nmm. The dangerous act of removing the safety element is reducing the energy to actuate the trigger by 1,4%. This is trading one life saving device for an undetectable decrease in trigger pull. The removing of the main or hammer spring decreases the necessary energy to 118 Nmm and after the cylinder is removed the instrument shows a required energy of 101 Nmm. If the cylinder is not in place it is necessary to deactivate the blocking of the trigger system with a paper clip or another device. From these test results it is easy to extract the energy that is consumed by every single part:

Part	relevant energy [N mm]	relevant energy [%]
Rebound Spring	101,3 N mm	24,4 %
Cylinder	16,6 N mm	4,0 %
Main Spring	292,0 N mm	70,2 %
Safety bar	5,9 N mm	1,4 %

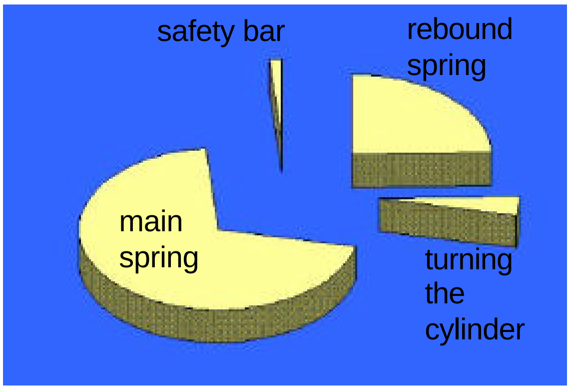

Table 1 Analysis of the energy distribution in a S&W revolver

This analysis can work as a basis to reduce the energy to actuate the trigger. The reduction can be achieved by decreasing the friction or force in non-critical areas, where no safety hazards or a loss ignition energy are occurring. After a certain experience the estimation of the proper setting for the main spring to insure proper ignition at all times can be done from the results of the instrument. Keep in mind, that the energy stored in a mechanical system contains the friction and that this energy is working against friction again, when the trigger is disengaged.

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