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January 10, 1950

TO: H. J. Hackman
 FROM: W. E. Lock
 SUBJECT: MODEL 721, Cal. .270 WIN.
CUSTOMER COMPLAINT (Blown Bolt Head)

This report deals with a customer complaint concerning a broken Bolt Lug which occurred when using a powder load of 45 grains of 4320 powder. As you probably recall, you requested us to duplicate the loading and attempt to obtain comparable results.

The test involved the firing of three M/721 Rifles, one being an early model and two current models.

Details of Test

<u>Bullet Wgt.</u>	<u>Powder</u>	<u>Load</u>	<u>Results</u>
150 gr.	4320	59-6	Hard Extraction
150 gr.	4320	45 gr.	No apparent high pressure
150 gr.	4320	45 gr. 1 primer on top of powder charge	No excessive pressure
150 gr.	4320	45 gr. 1 primer on bottom of powder charge	No excessive pressure
150 gr.	4320	45 gr. 1 primer in middle of powder charge	No excessive pressure
150 gr.	Caseful Unique		Very high pressure; impossible to unlock bolt
150 gr.	Caseful Bulls Eye		Broke right & left locking lugs
150 gr.	4320	59.6 (high pressure primer)	Bolt difficult to unlock; Excessive pressure

H. J. Hickman

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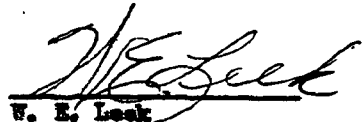
Conclusions

It is to be concluded that,

1. The strength of the M/721 Rifles produced at the present time is comparable to the early models.
2. In the three guns tested it was impossible to duplicate a broken "Bolt Lug" condition by using a powder load of 45 gr. of A320 powder and a 150 gr. bullet. (customers load)
3. It was impossible to obtain broken lugs on the Bolt when using an overload of A320 powder in the amount of 59.6 grains with a 150 gr. bullet. (4.6 grains more than the customers load). 59.6 grains is a full cartridge case of A320 powder.
4. Extremely high pressures and possible Bolt Lug fractures can be obtained by using a cartridge case full of Unique or Bulls-eye powder.
5. A combination of primers and powder in a cartridge case does not increase the pressure of a primed round.

Comments

It is difficult to determine in this case just how or what caused the breakage of the Bolt Lug in the customer's gun. The design of the M/721 Bolt is more than adequate in strength to handle loads in excess of those claimed by the customer. We know from experience and tests that powder stored over a long period of time, or under unusual atmospheric conditions, develops erratic pressures but I feel that the M/721 Bolt is adequately strong to cope with erratic pressures. Discussions with W. H. Walker and K. R. Chadwick lead me to believe that the difficulty is metallurgical.


W. E. Leek
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WEL:NL