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RESEARCH TEST and MEASUREMENT REPORT - Report No. 821871

M-700 LONG ACTION BDL NO-BIND STAMPED MAGAZINE FOLLOWER INVESTIGATION

Prepared by: J. Baocetta

Date Prepared: 9/23/82

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Signature

Date

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Mens. & Mech. Analysis Lab

Signature

Date

TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 821871
REPORT TITLE: M/700 LONG ACTION BDL - NO-BIND STAMPED MAGAZINE
FOLLOWER INVESTIGATION
MODEL(S): 700 ADL Rifles
GAUGE OR CALIBER: 30-06, 25-06, 270 & 7mm Rem. Mag.
DATE: 9-23-82
WORK ORDER NO.: C-5013
PART NAME: Magazine Followers
DESIGNER/ENGINEER: P. Nasypany

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF GUNS TESTED _____
3. FUNCTION TEST - NO. OF GUNS TESTED 36 Rifles Tested
4. ACCURACY TEST - NO. OF GUNS TESTED _____
5. MEASUREMENTS - TYPE: _____
6. ENVIRONMENTAL TEST
7. AMMUNITION TESTING & EVALUATION - TYPE: _____
8. VISUAL EVALUATION - _____ OUT OF _____ GUN SAMPLE
9. ENDURANCE - NO. OF GUNS TESTED: _____

NO. OF ROUNDS PER GUN: _____

TOTAL ROUNDS FIRED IN TEST: _____

AMMO TYPE: MAGS. _____; TARGET: _____

RIM FIRE _____ CENTER FIRE _____

September 23, 1982

TO: J. H. Hennings

FROM: J. Baggetta

REPORT TITLE: M/700 - LONG ACTION BDL - NO-BIND STAMPED, MAGAZINE
FOLLOWER INVESTIGATION

ABSTRACT

This report is a composite of the six individual tests run on two New Design BDL Long Action Bind Stamped Magazine Followers (Design No.'s 2 and 3) and an altered magazine spring (Design No. 2). Refer to Data Sheet No. 1 for design descriptions. They were brought to the Test Lab by Paul Nasypany of the current product design group for testing during the months of May through July of 1982. The testing included a live unload test in lab shooting jacks and several live fire field function tests at the Lion Fish and Game Club 100 yard range. Various bullet weights of competitive and Remington Ammunition, along with different feed rates were used in the test. All tests used M/700 ADL Long Action Rifles.

SCOPE OF TEST

To evaluate the functional performance of the different design followers in the Remington M/700 Rifle.

TEST RESULTS

Results of these tests are summarized as follows:

A. Test No. 1 Follower Design No. 2

1. Jack Live Round Unload Function Test

Of the four calibers tested, only the 30-06 caliber experienced follower related malfunctions. A total of seven follower tip downs were experienced on one 30-06 caliber rifle for a total malfunction rate of 17.5%. All control rifles experienced no follower related malfunctions.

2. Field Test

Only one caliber (30-06) was tested. No controls were tested. Due to problems with the magazine spring sliding forward in the magazine follower the test was stopped and the rifles were returned to Paul Nasypany for review.

B. Test No. 2 - Follower Design No. 3 - With altered magazine spring Design No. 1

1. Jack Live Round Unload Function Test

No control rifles were tested. No malfunctions occurred on the 30-06, 25-06, 7mm Rem. Mag. sample rifles. The .270 caliber experienced four shell stem magazine malfunctions for a malfunction rate of 2.5% in 160 rounds fired.

2. Field Test

No control rifles were tested. There were 104 follower related malfunctions out of 2,125 rounds fired on the four calibers tested. The overall malfunction rate was 4.9% for the four calibers.

TEST RESULTS - cont'd.

C. Test No. 3 - Follower Design No. 3 - With Altered Magazine Spring Design No. 2

1. Jack Live Round Unload Function Test

No test was run.

2. Field Test

Control rifles were shot in this test. Follower related malfunctions occurred in the 30-06 and .270 calibers with the samples; for a 1.9% malfunction rate for 30-06 caliber and a 2.7% malfunction rate for the .270 caliber. The 25-06 and 7mm Rem. Mag. calibers shot malfunction free. With the exception of the 30-06 caliber control, one stem chamber high occurred on one rifle for an overall malfunction rate of 0.1% in 225 rounds fired. The other control rifles experienced no malfunctions.

D. Test No. 4 - Follower Design No. 3 - With Altered Magazine Spring Design No. 2

1. Jack Live Round Unload Function Test

No malfunction occurred on the sample rifles, .270 and 25-06 calibers. The 30-06 caliber experienced a 3.5% malfunction rate and the 7mm Rem. Mag. caliber experienced a 11.6% malfunction rate. No control rifles were tested.

2. Field Test

No test was run.

E. Test No. 5 - Repeat of Test No. 4 (30-06 Only)

1. Jack Live Round Unload Function Test

The 30-06 caliber sample experienced 2.0% malfunction rate in 510 rounds fired. No control rifles were tested.

F. Test No. 6 - Repeat of Test No. 5

1. Jack Live Round Unload Function Test

Only one 30-06 and one 7mm Rem. Mag. caliber were tested. No malfunctions were experienced on either sample rifles. No control rifles were tested.

REPORT TEXT

Note: BDL Followers were used because ADL Long Action No-Bind Stamped Followers were not available. Refer to Appendix B, Photo No. 1, for a photograph of the two. All Jack & Field Cycle test data is compiled on Data Sheet No. 1 in Appendix "A". Also in Appendix "B" is Photo No. 2. This shows the difference between magazine spring No. 1 and No. 2.

A. Test No. 1 - Follower Design No. 2

The test condition for these tests are:

Samples

- o Five (5) rifles of each caliber were tested: - 30-06, 270, 25-06 and 7MM Rem. Mag.
- o Used current BDL machine followers - Design No. 2 No-Bind Stamped Long Action.
- o The followers were nickel-plated but not heat-treated.
- o The No-Bind ridge height - .320".
- o Current production magazine and magazine springs were used.

Controls

- o Five (5) rifles of each caliber were tested - 30-06, 270, 25-06 and 7MM Rem. Mag.
- o The control rifles were tested with current machine magazine followers and magazine springs.

1. Jack Live Round Unload Function Test

The only caliber that experienced follower related malfunctions with the sample rifles was the 30-06 caliber. Seven Follower Tip Downs were recorded for rifle Serial No. B6382440 (30-06 caliber). Four of the Tip Downs occurred with Remington 125gr. Soft Point. All of these Tip Downs occurred on the fourth round out of the magazine box. The overall malfunction rate for these five (5) rifles was 17.5%. All five (5) of the control rifles in the four calibers tested did not experience any follower related malfunctions.

2. Field Test

The only rifles used in this test were the five 30-06 caliber rifles used in the Jack Live Unload Function Test. No control rifles were used. Due to excessive bolt override malfunctions caused by the magazine spring sliding forward in the magazine follower, the test was stopped. The reason why this occurred during the field cycle test is because during live fire the recoil allowed the spring to move forward in the magazine follower. (Refer to Photo No. 3) Because the test was stopped only 45 rounds per rifle was fired. The total malfunction rate for the five (5) rifles was 27.0% in 225 rounds total. This test was designed to fire 255 rounds per rifle.

B. Test No. 2 - Follower Design No. 3

The conditions for this test are:

Samples

- o Four rifles of each caliber were tested - 30-06, .270, 25-06 and 7MM Rem. Mag.
- o Used current BDL Machine Followers Design No. 3 - No-Bind Stamped Long Action.
- o The followers were nickel-plated and heat-treated.
- o The No-Bind ridge height was .355" - .350".
- o Current production magazine and altered mag. spring Design No. 1. The dimple placed on right side of magazine spring.

Controls - No control rifles were tested.

1. Jack Live Round Unload Function Test

The only caliber that experienced follower related malfunctions with the sample rifles was the .270 caliber. Four shell stem magazine malfunctions occurred on one rifle Serial No. B-6382690 (.270 caliber). The four malfunctions occurred with Remington 150 gr. Soft Point. All of these shell stem magazines occurred on the fourth round out of the magazine box. The overall malfunction rate for the four rifles was 2.5% in 640 total rounds fired.

2. Field Test

All of the four calibers tested with the sample rifles experienced follower related malfunctions.

In the 30-06 caliber, only two rifles malfunctioned. They are:

Rifle No. B-6318067

a.) 17 Bolt overrides in 100 rounds fired

- 9 of the malfunctions occurred with Remington 165 gr. Pointed Soft Point
- 3 occurred 2nd round out of magazine
- 3 occurred 3rd round out of magazine
- 3 occurred 4th round out of magazine
- 2 occurred with Remington 180 gr. Pointed Soft Point - 3rd round out of magazine
- 6 occurred with Remington 220 gr. Soft Point - 2 were 2nd, 2 were 3rd and 2 were 4th round out of magazine.

The test was stopped because of excessive malfunctions.

Rifle No. B-3676272

a.) 10 Bolt overrides in 135 rounds fired.

- 3 occurred with Federal 150 gr. Soft Point - All on 4th round out of magazine
 - 6 occurred with Federal 180 gr. Soft Point - 3 were 2nd and 3 were 4th round out of magazine
 - 1 occurred with Remington 165 gr. Pointed Soft Point - 3rd round out of magazine
- The overall malfunction rate for 30-06 was 5.3% in 505 rounds fired.

Rifle No. B-6382690

a.) 20 stem chambers low in 165 rounds fired.

- 2 occurred with Remington 100 gr. Pointed Soft Point - 4th round out of magazine
- 3 occurred with Remington 130 gr. Pointed Soft Point - 4th round out of magazine
- 3 occurred with Remington 150 gr. Soft Point - 4th round out of magazine
- 3 occurred with Winchester 100 gr. Pointed Soft Point - 4th round out of magazine
- 3 occurred with Winchester 150 gr. Soft Point - 4th round out of magazine
- 3 occurred with Winchester 130 gr. Silver Tip - 4th round out of magazine

Rifle No. B-6383957

a.) 16 Bolt overrides in 165 rounds fired.

Rifle No. B-6383957 - continued

- 2 occurred with Federal 150 gr. Soft Point - 4th round out of magazine
- 2 occurred with Winchester 130 gr. Soft Point - 4th round out of magazine
- 3 occurred with Winchester 130 gr. Silver Tip - 4th round out of magazine
- 3 occurred with Federal 150 gr. Soft Point Premium - 4th round out of magazine
- 3 occurred with Federal 150 gr. Nosler Premium - 4th round out of magazine
- 3 occurred with Winchester 150 gr. Soft Point - 4th round out of magazine

The overall malfunction rate for .270 caliber was 5.5% in 660 rounds fired.

In the 25-06 caliber only one rifle malfunctioned. It is:

Rifle No. B-6382231

- a.) 17 Bolt overrides in 105 rounds fired
- 3 occurred with Federal 90 gr. Hollow Point - 4th round out of magazine
 - 5 occurred with Winchester 120 gr. Pointed Expanding Point - 2 were 3rd, 3 were 4th round out of magazine
 - 9 occurred with Winchester 90 gr. Pointed Expanding Point - 3 were 2nd, 3 were 3rd, 3 were 4th round out of magazine

The overall malfunction rate for 25-06 caliber was 4.0% in 420 rounds fired.

In the 7MM Rem. Mag. caliber four rifles malfunctioned. They are:

Rifle No. B-6393439

- a.) One shell jumps magazine in 135 rounds fired
- b.) 9 Bolt overrides in 135 rounds fired
- 2 occurred with Federal 165 gr. Boat-Tail Soft Point - 3rd round out of magazine
 - 2 occurred with Federal 175 gr. Soft Point - 1 was 2nd, 1 was 3rd round out of magazine
 - 2 occurred with Winchester 125 gr. Soft Point - 2nd round out of magazine
 - 4 occurred with Winchester 175 gr. Soft Point - 3 were 2nd, 1 was 3rd round out of magazine

Rifle No. B-6391117

- a.) Two Bolt overrides in 135 rounds fired
- 2 occurred with Winchester 150 gr. Soft Point - 1 was 1st, and 1 was 2nd round out of magazine

Rifle No. B-6393763

- a.) Four Bolt overrides in 135 rounds fired
- 1 occurred with Federal 175 gr. Soft Point - 1st round out of magazine
 - 3 occurred with Winchester 150 gr. Soft Point - 2 were 1st and 1 was 3rd round out of magazine

Rifle No. B-6393033

- a.) One stem chamber high in 135 rounds fired
- b.) Two shell jumps magazine in 135 rounds fired
- c.) Six bolt overrides in 135 rounds fired
- 4 occurred with Winchester 125 gr. Soft Point - 3 were 1st - 1 was 3rd round out of magazine
 - 1 occurred with Winchester 175 gr. Soft Point - 3rd round out of magazine
 - 4 occurred with Winchester 150 gr. Soft Point - 3 were 2nd - 1 was 3rd round out of magazine

The overall malfunction rate for 7MM Rem. Mag. was 4.6% in 540 rounds fired.

C. Test No. 3 - Design Magazine Follower No. 3 With Altered Magazine Spring Design No. 2

The test conditions for this test are:

Samples

- o Four rifles of each caliber were tested - 30-06, .270, 25-06 and 7MM Rem. Mag.
- o Used current BDL Machine Follower Design No. 3 - No-Bind Stamped Long Action
- o The followers were nickel-plated and heat-treated.
- o The No-Bind ridge height - .355" - .350"
- o ADL Long Action Magazine Spring Design No. 2 - A dimple was placed .930" from the front and .070" from the side to prevent the spring from moving forward in the follower.

Controls

- o Four rifles of each caliber were tested - 30-06, .270, 25-06 and 7MM Rem. Mag.
- o The control rifles were tested with current machine magazine followers and magazine springs.

1. Jack Live Unload Function Test

No test was run.

2. Field Test

Of the four calibers tested with the sample rifles the 30-06 and .270 calibers experienced follower related malfunctions.

In the 30-06 caliber all four rifles malfunctioned. They are:

Rifle No. B-6279938

- a.) 5 stem chambers high in 255 rounds fired
- b.) 1 stem chamber low in 255 rounds fired
 - 1 occurred with Remington 220 gr. Soft Point - 4th round out of magazine
 - 4 occurred with Winchester 180 gr. Soft Point - 1 was 1st - 1 was 2nd and 2 were 3rd round out of magazine
 - 1 occurred with Winchester 220 gr. Soft Point - 4th round out of magazine

Rifle No. B-6318067

- a.) Two stem chamber low in 255 rounds fired
 - 2 occurred with Remington 220 gr. Soft Point - 4th round out of magazine

Rifle No. B-6376272

- a.) Two shell stem magazine in 255 rounds fired
 - b.) Six stem chamber low in 255 rounds fired
 - 1 occurred with Remington 150 gr. Pointed Soft Point - 4th round out of magazine
 - 1 occurred with 165 gr. Pointed Soft Point - 4th round out of magazine
 - 2 occurred with Remington 180 gr. Pointed Soft Point - 4th round out of magazine
 - 1 occurred with Federal 150 gr. Soft Point - 4th round out of magazine
 - 1 occurred with Federal 180 gr. Soft Point - 4th round out of magazine
 - 2 occurred with Winchester 110 gr. Pointed Soft Point - 4th round out of magazine
- The overall malfunction rate for the 30-06 caliber rifles was 1.9% in 1020 rounds fired.

Rifle No. B-6214699

- a.) Two shell stem magazine in 255 rounds fired
- b.) One stem chamber low in 255 rounds fired
 - 2 occurred with Remington 125 gr. Pointed Soft Point - 4th round out of magazine

Rifle No. B-6214699 - continued

- 1 occurred with Remington 180 gr. Soft Point - 4th round out of magazine

In the .270 caliber, two rifles malfunctioned. They are:

Rifle No. 6382690

- a.) 16 stem chamber low in 165 rounds fired
- b.) 1 Bolt override in 165 rounds fired
 - 2 occurred with Remington 100 gr. Pointed Soft Point - 4th round out of magazine
 - 1 occurred with Remington 130 gr. Pointed Soft Point - 4th round out of magazine
 - 3 occurred with Remington 150 gr. Soft Point - 4th round out of magazine
 - 3 occurred with Federal 130 gr. Soft Point - 4th round out of magazine
 - 3 occurred with Federal gr. Soft Point - 4th round out of magazine
 - 1 occurred with Winchester 130 gr. Soft Point - 4th round out of magazine
 - 1 occurred with Winchester 150 gr. Soft Point - 4th round out of magazine
 - 3 occurred with Federal 150 gr. Nosler - 4th round out of magazine

Rifle No. B-6383957

- a.) One stem chamber right in 165 rounds fired
 - 1 occurred with Federal 150 gr. Soft Point - 4th round out of magazine
- The overall malfunction rate for the .270 caliber was 2.7% in 660 rounds fired.

Controls

Of the four calibers tested only the 30-06 caliber experienced a follower related malfunction. It occurred on one rifle - B-6376272. The malfunction was a stem chamber high experienced with Winchester 220 gr. Soft Point - 1st round out of magazine. The overall malfunction rate was .01% in 225 rounds fired.

D. Test No. 4 - Follower Design No. 3 - With Altered Magazine Design No. 2

Conditions for this test are:

Samples

- o All four calibers were tested - (2) 30-06, (1) .270, (1) 25-06 and (2) 7MM Rem. Mag.
- o Used current BDL Machine Follower Design No. 3 - No-Bind Stamped Long Action
- o Follower nickel-plated and heat-treated
- o No-Bind ridge height was .355" - .350"
- o ADL Long Action Magazine Box Design No. 1 - Left side feed lip was bent straight in area of the stamped No-Bind Follower ridge contact.
- o ADL Long Action Magazine Spring Design No. 2 - A dimple was placed .930" from the front and .070" from the side to prevent the spring from moving forward in the follower.

Controls

No controls were used in this test.

1. Jack Live Round Unload Function Test

Only 30-06 and 7MM Rem. Mag. experienced follower related malfunctions.

In the 30-06 caliber both rifles tested malfunctioned. They are:

Rifle No. B-6279938

- a.) 11 stem chamber right in 255 rounds fired
 - 2 occurred with Remington 220 gr. Soft Point - 2nd round out of magazine
 - 5 occurred with Winchester 180 gr. Soft Point - 1 was 1st, 2 were 2nd and 2 were 4th round out of magazine.

Rifle No. B-6376272

a.) One stem chamber low in 255 rounds fired.

Six Bolt overrides in 255 rounds fired.

-One occurred with Remington 125 gr. Pointed Soft Point - 4th round out of magazine

-3 occurred with Winchester 180 gr. Soft Point - 4th round out of magazine

-3 occurred with Winchester 220 gr. Soft Point - 4th round out of magazine

The overall malfunction rate for 30-06 caliber was 3.5% in 510 rounds fired.

In the 7MM Rem. Mag. caliber, one rifle tested experienced malfunctions. It is:

Rifle No. B-6393439

a.) Three follower binds in 135 rounds fired

-2 occurred with Remington 175 gr. Pointed Soft Point - 4th round out of magazine

-1 occurred with Winchester 125 gr. Soft Point - 4th round out of magazine

The overall malfunction rate for 7MM Rem. Mag. caliber was 2.2% in 135 rounds fired.

E. Test No. 5 - Follower Design No. 3 - With Altered Magazine Spring Design No. 2

The conditions for this test are the same as Test No. 4, except only 30-06 and 7MM Rem. Mag. calibers were tested. No control rifles were used.

In the 30-06 caliber one of the two rifles experienced follower related malfunctions. Rifle No. B-6279938 experienced 10 stem chamber lows.

-2 occurred with Remington 220 gr. Soft Point - 1st and 2nd round out of magazine

-6 occurred with Winchester 180 gr. Soft Point - 3 were 1st and 3 were 3 rounds out of magazine.

-2 occurred with Winchester 220 gr. Soft Point - 1st and 3rd round out of magazine

The overall malfunction rate for 30-06 caliber was 2.0% in 510 rounds fired.

In the 7MM Rem. Mag. caliber there were no malfunctions on the rifle tested.

F. Test No. 6 - Is a Retest of Test No. 5

The test conditions are:

o Only one rifle was tested. It was the 30-06 caliber rifle Serial No. B-6279938 that experienced the large number of stem chamber lows malfunctions in Test No. 5.

o One alteration was made to the left side feed lip in the rifle receiver. It was cut back to .050" which is to model drawing specs.

The rifle did not experience any follower related malfunctions.

No control rifles were used.

TEST PROCEDURE

A. Test No. 1

1. Jack Live Round Unload Function Test

Five rifles of each caliber; 30-06, 25-06, .270 and 7MM Rem. Mag. were used in this test. First the long action BDL No-Bind stamped followers were assembled into the rifles and a live round unload test was run in the Test Lab shooting jacks. Various feed speeds were used - Slow - Medium - Fast. Remington ammunition was the only ammo. used. The bullet weights used were the lightest and heaviest in each caliber. Then the same rifles were assembled with the current machined followers (current production) and the test was reported.

2. Field Cycle Test

The field cycle test was conducted at the Ilion Fish and Game Club 100 yard range. The weather was sunny and warm. The rifles were air-cooled after every 20 rounds fired. Five (5) rifles of each caliber; 30-06, .270, 25-06 and 7MM Rem. Mag. were used in this test. First, the long action BDL No-Bind Stamped Followers were assembled into the rifles. The test was run with five (5) shooters incorporating the round robin system and varying feed speeds of slow, medium and fast. All bullet weights of Remington, Winchester and Federal ammunition was used. All malfunctions and follower related malfunctions were recorded. The rifles were then reassembled with the current production magazine followers. The same procedure was followed to run this phase of testing as above.

B. Test No. 2

The procedures used in this Test No. 2 are the same as used in Test No. 1, except only four (4) rifles of each caliber were used. (Five (5) of each caliber were used in Test No. 1.)

C. Test No. 3

Field Cycle Test

The field cycle test was run at the Ilion Fish and Game Club 100 yd. range. The weather was overcast and warm. The rifles were air-cooled every 20 rounds. First, the long action, BDL No-Bind Stamped Followers were assembled onto the rifles. The test consisted of five (5) shooters incorporating the round robin system and the feed rates were varied - Slow, Medium and Fast. All bullet weights of Remington, Winchester and Federal were used. Four (4) rifles of each caliber - 30-06, 25-06, .270 and 7MM Mag. were used. All malfunctions and follower related malfunctions were recorded. Then the same rifles and assembled the current production magazine followers into them and the same test procedure was followed as above.

D. Test No. 4 - 5

Jack Live Round Unload Function Test

Two rifles in the 30-06 caliber and one rifle of each of 25-06, .270 and 7MM Rem. Mag. caliber were used in this test. First, the Long Action BDL No-Bind Stamped Followers were assembled into the rifles and a live round unload function test was run in the test lab shooting jacks. Various feed speeds were used - Slow, Medium and Fast. Remington, Winchester and Federal ammunition in all bullet weights were used.

TEST PROCEDURE - continued

E. Test No. 5

Jack Live Round Unload Function Test

The procedures used in this test are the same as used in Test No. 4, except only two (2) rifles of 30-06 caliber and one (1) 7MM Rem. Mag. caliber were used.

F. Test No. 6

Jack Live Round Unload Function Test

The procedures used on Test No. 6 are the same as used in Test No. 5, except only one 30-06 caliber rifle was used.

Test No. 1 - M/700 ADL Rifles Used

7MM Rem. Mag. Caliber

B-6311964
B-6310781
B-6310719
B-6318560
B-6309765

25-06 Caliber

B-6312478
B-6312350
B-6739246
B-6264964
B-6264256

.270 Caliber

B-6342519
B-6340630
B-6341085
B-6347536
B-6341133

30-06 Caliber

B-6382440
B-6382788
B-63828C4
B-6382417
B-6378452

Test No. 2 - No. 6 - M/700 ADL Rifles Used

7MM Rem. Mag. Caliber

B-6393439
B-6391117
B-6393763
B-6393033

25-06 Caliber

B-6377065
B-6382231
B-6377767
B-6377877

.270 Caliber

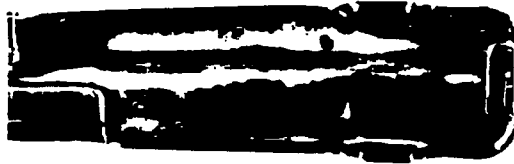
B-6382690
B-6382112
B-6385366
B-6383957

30-06 Caliber

B-6279938
B-6318067
B-6214699
B-6376272

" APPENDIX " A "

Photos



ADL



BDL

PHOTO # 1



#1

#2

PHOTO # 2



Spring moved forward

PHOTO #3

" APPENDIX " B "

Data Sheets

R2512102

J. H. Huggins

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KINZER V. REMINGTON