TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 821321 Supplement

REPORT TITLE: M/Seven & M/700 .222 Caliber Follower - Spring Evaluation
Supplement to Report No. 821321

MODEL(S): M/Seven, M/700 ADL, M/700 BDL

GAUGE OR CALIBER: .222 Caliber

DATE: 4 - 19 - 83

WORK ORDER NO.: G-0196-000

PART NAME: Magazine Spring and No-Bind Follower

DESIGNER/ENGINEER: Requested by C. E. Ritchie

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF GUNS TESTED _____
3. FUNCTION TEST - NO. OF GUNS TESTED 12
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: 18 Live - Unload
~~18 Fired~~

TOTAL ROUNDS FIRED IN TEST: 2592

AMMO TYPE: MAGS. _____; TARGET: _____

RIM FIRE _____ CENTER FIRE X

April 15, 1983

TO: R. E. NIGHTINGALE

FROM: F. L. SUPRY

REPORT TITLE: M/SEVEN & M/700 .222 CALIBER FOLLOWER - SPRING EVALUATION
Supplement to Report No. 821321

ABSTRACT

The results generated during the first phase (1/3 of the overall test) of the M/Seven and M/700 .222 Caliber Follower - Spring Evaluation were reviewed by C. Evan Ritchie (Sr. Supervisor - Testing, Measurement and Mechanical Analysis Lab), Dr. James Lucas and Steve Larson (Consultants - Applied Statistics Group, E. I. DuPont deNemours & Co., Inc.). As a result of the review, it was decided to evaluate six (6) red and six (6) yellow magazine springs,all twelve (12) assembled with Design No. 6 No-Bind Followers. Each spring is to be tested in two (2) of the best performing rifles and two (2) of the worst performing rifles in the M/Seven, M/700 ADL, and M/700 BDL .222 caliber rifles, selected from the results of the first phase of the .222 caliber follower - spring evaluation.

SCOPE OF TEST

To compare the two (2) best performing spring-follower combinations in the best and worst performing rifles; to determine the most compatible combination in each model, and the most compatible combination overall.

TEST RESULTS

The yellow spring (ref. Dwg. No. 91133 - Current Magazine Spring) had fewer malfunctions overall than the red spring (Ref. Dwg. No. 91133 - Current Magazine Spring – Revision 2), and fewer total malfunctions in the Model Seven, M/700 ADL and M/700 BDL rifles tested. The following results were obtained:

Model	Yellow Spring Malfunctions	Red Spring Malfunctions
M/700 BDL	59	83
M/700 ADL	35	43
M/Seven	21	27
Total	115	153

REPORT TEXT

The test was conducted using slow feed, medium feed, and fast feed cycles, in both live unload and firing modes.

Two types of ammunition were used:

Cartridge A: Remington R2221, 50 gr. PSP
Cartridge B: Remington R2224, 55 gr. Metal Case

The following results were obtained:

Total Malfunctions	=	268
Total Live-Unload Malfunctions	=	95
Total Fired Malfunctions	=	173
Total Cart. A Malfunctions	=	141
Total Live-Unload Malfunctions	=	48
Total Fired Malfunctions	=	93
Total Cart. B Malfunctions	=	127
Total Live-Unload Malfunctions	=	47
Total Fired Malfunctions	=	80
Total Yellow Spring Malfunctions	=	115
Total Cart. A (Yellow Spring) Malfunctions	=	64
Total Cart. B (Yellow Spring) Malfunctions	=	51
Total Red Spring Malfunctions	=	153
Total Cart. A (Red Spring) Malfunctions	=	76
Total Cart. B (Red Spring) Malfunctions	=	77

For malfunctions breakdown per individual spring, per round out of magazine box, per model, per ammunition type, per feeding cycle speed and per rifle, refer to data sheets located in Appendix "A".

TEST PROCEDURE

A. Preparation:

- The results generated by the first phase of the M/Seven & M/700 .222 Caliber Follower-Spring Evaluation were reviewed, and the two (2) best and the two (2) worst performing rifles were selected in the M/Seven, M/700 ADL, and the M/700 BDL. The following rifles were selected:

	Best Performing	Worst Performing
M/7	7602525	7602593
	7602568	7602529
M/700 ADL	B6295043	B6327369
	B6293294	B6257041
M/700 BDL	B6294940	B6361428
	B6293053	B6257066

- Design No. 6 No-Bind Followers were assembled on six (6) Yellow Springs and six (6) Red Springs.

B. Sequence:

1) One of the twelve rifles to be tested was selected at random and assembled with the first Yellow Spring – Design No. 6 No-Bind Follower combination.

2) The rifle was then placed in a shooting jack and eighteen (18) rounds of ammunition were cycled through the rifle, without firing. (Six at slow feeding cycle speed, six at medium feeding cycle speed, and six at fast feeding cycle speed). All malfunctions were recorded.

3) The eighteen (18) rounds were recycled through the rifle at the same feeding cycle speeds with each round being fired. All malfunctions were recorded.

4) The rifle was removed from the shooting jack and the first Yellow Spring Design No. 6 No-Bind Follower was removed and reassembled in another of the twelve (12) rifles to be tested.

5) Steps 1 through 4 were repeated until all the test rifles had been functioned with the first Yellow Spring - Design No. 6 No-Bind Follower.

6) Steps 1 through 5 were then done with the first Red Spring - Design No. 6 No-Bind Follower.

7) The alteration of the Yellow Spring and The Red Spring combination was continued until all twelve (12) Spring-Follower combinations had been functioned in each test rifle.

TEST PROCEDURE - cont'd.

B. Sequence - cont'd.

8) The twelve (12) rifles were reassembled with their original springs and followers and taken to the Model Shop for measurements.

9) The data generated by this test was compiled and the Data Sheets included with this report.

10) The entire test was completed by Fred Supry (Specialist - Research Test Lab).

C. Appendix:

- Appendix A

  Malfunction Data Sheet

  Malfunctions per round out of magazine by Model.
  Malfunctions per round out of magazine per ammo type.
  Malfunctions per round out of magazine per spring type.
  Variable breakdown.

Appendix B

- Work Sheets

APPENDIX "A"

(Data Sheets)

Malfunctions – Variable Breakdown

Total Malfunctions	=	268
Total Live Unload	=	95
Total Fired	=	173

Malfunctions

Total A (ammo)	=	141
Total Live Unload	=	48
Total Fired	=	93
Total Yellow Spring	=	115
Total Yellow A	=	64
Total Yellow B	=	51

Malfunctions

Total B (ammo)	=	127
Total Live Unload	=	47
Total Fired	=	80
Total Red Spring	=	153
Total Red A	=	76
Total Red B	=	77

Best Rifles

	Yellow	Red
M 700 BDL	12	6
M/700 ADL	17	20
M/Seven	0	1
Total	29	27

Worst Rifles

Yellow	Red
47	77
18	23
21	26
86	126

Totals

	Yellow	Red
M/700 BDL	59	83
M/700 ADL	35	43
M/Seven	21	27

MODEL 7,700 ADL, 700 BDL - SPRING COMPARISON 821321

with #6 NO BIND FOLLOWER 4-12-83

MALFUNCTION DATA SHEET FLS

SPRING NO. ↓	AMMO CODE ↓	F.T.D.		1 S.J.M.		2 B.O.R.		3 S.L.		4 S.R.		5 S.H.		6 S.Lo.	
		LIVE	FIRE	LIVE	FIRE	LIVE	FIRE	LIVE	FIRE	LIVE	FIRE	LIVE	FIRE	LIVE	FIRE
Y-1	A		2	2	3	4	1	3	6		2	1	1	2	
MALF=27															
Y-2	B				1	4	4	1	3	1	2				
MALF=16															
Y-3	A				1		3	2	4	2	3		1		
MALF=20															
Y-4	B						5	2	3		1				
MALF=17															
Y-5	A			3	2	2	2	1	4	1	2				
MALF=17															
Y-6	B			3	1		5	1	3	2	2			1	
MALF=18															
TOTAL	A		2	5	6	6	10	6	14	3	7	1	2	2	
	B			3	2	4	14	4	9	3	11			1	
R-1	B				2	2	5	8	8	3	3				
MALF=31															
R-2	A					2		4	9	2	3				1
MALF=21															
R-3	B			1	3	1		3	3	3	2		1	1	1
MALF=19															
R-4	A			2	5		3	1	7	2	6				
MALF=26															
R-5	B				1	4	4	4	4	4	6				
MALF=27															
R-6	A			3	3	1	7	8	3	3	4			2	
MALF=29															
TOTAL	A			5	8	3	10	8	19	7	13			2	1
	B			1	6	7	9	15	15	10	11		1	1	1

MODEL	PART	SERIAL		SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL
7	A	Y	L																			1	7602568
			F																				
7	B	Y	L																			1	7602568
			F																				
7	A	Y	L																			2	7602529
			F																				
7	B	Y	L							1			1							1		2	7602529
			F																				
7	A	Y	L	2	2	1					1											9	7602593
			F	1	1					1	1					2	1	1					
7	B	Y	L	1						1												9	7602593
			F			1										1							
7	A	Y	L																			10	7602525
			F																				
7	B	Y	L																			10	7602525
			F																				
			L																				
			F																				
	TOTAL A		L	2	2	1				1	1											=	6 > 14 > 21
			F	1	1					1	1					2	1	1				=	8
	TOTAL B		L	1						1												=	2 > 7
			F			1				1			1			1				1		=	5
TOTAL →			■	4	3	2				3	2		1			3	1	1		1		=	21
			■																				
			L																				
			F																				

TEST: (MODEL 7) MALFUNCTIONS per round out of magazine DATE: 4-12-83 TESTER: FLS PG. 1 WR# 821321 Supp.

MODEL	PART	SURF.		SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL #
7	A	R	L																			1	7602568
			F																				
7	B	R	L																			1	7602568
			F																				
7	A	R	L																			2	7602529
			F																				
7	B	R	L																	1		2	7602529
			F																				
7	A	R	L	1	1	1				1								1				9	7602593
			F	2		2				2		1				1		1					
7	B	R	L	1	3					1												9	7602593
			F	3		1				1								1					
7	A	R	L																			10	7602525
			F																				
7	B	R	L																	1		10	7602525
			F																				
			L																				
			F																				
	TOTAL A		L	1	1	1				1								1				=	5/10 > 15 > 27
			F	2		2				2		1				1		1		1		=	
	TOTAL B		L	1	3					1										1		=	6/6 > 12
			F	3		1				1								1				=	
TOTAL		■		7	4	4				5		1				1		3		2		=	27.
			L																				
			F																				

TEST: (MODEL 7) MALFUNCTIONS per round out of Magazine. DATE: 4-12-83 TESTER: FLS PG. 2 WR# B21321

MODEL	PART	SERIAL		SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL
700 ADL	A	R	L				1																
			F										1									3	B6293294
"	B	R	L				1						1	1						1		3	"
			F										1										
"	A	R	L											1								4	B6257041
			F					1		1				2						3			
"	B	R	L																	1		4	"
			F					2					1	1					1	2			
"	A	R	L					2														7	B6295043
			F							1					1				1				
"	B	R	L							2				2								7	"
			F	1	1			1						1									
"	A	R	L				1													2		8	B6327369
			F											1									
"	B	R	L																	1		8	"
			F					1						1									
			L																				
			F																				
	TOTAL A		L				2	2						1								=	5 > 19 > 43
			F					1		2			1	3		1				6		=	14
	TOTAL B		L				1			2			1	3						3		=	10 > 24
			F	1	1			4					2	3					1	2		=	14
			■																				
TOTAL →			■	1	1		3	7		4			4	10		1			1	11		=	43
			L																				
			F																				

TEST: (MODEL 700 ADL) MALFUNCTIONS DATE: 4-12-83 TESTER: FLS PG. 4 WR# 821321
Per round out of magazine.

MODEL	PART	SERIAL		SLOW						MEDIUM						FAST						#	SERIAL #
				1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6		
700 ADL	A	Y	L																				
			F				1															3	B6293294
"	B	Y	L	1			2	1						1						1			
			F								1		1	1								3	"
"	A	Y	L					1					1	1									
			F					1						2						3		4	B6257041
"	B	Y	L																				
			F					1						2			1			2		4	"
"	A	Y	L	1				1		1			1	1									
			F					1														7	B6295043
"	B	Y	L																				
			F											1						1		7	"
"	A	Y	L																1	1			
			F																			8	B6327369
"	B	Y	L																				
			F																1			8	"
			L																				
			F																				
	TOTAL A		L	1				2		1			1	2								=	7
			F				1	2						2					1	4		=	10
	TOTAL B		L	1			2	1						1						1		=	6
			F					1			1		1	4			1		1	3		=	12
			■																				
TOTAL →			■	2			3	6		1	1		2	9			1		2	8		=	35
			L																				
			F																				

17 + 18 = 35

TEST: MODEL 700 ADL DATE: 4-12-83 TESTER: FLS PG. 3 WR# B21321

MALFUNCTIONS PER ROUND OUT OF MAGAZINE.

MODEL	PART	SERIAL		SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL
700 BDL	A	R	L											1						1			
			F																	3		5	B6361428
"	B	R	L																1				
			F																	1		5	"
"	A	R	L				1						1									6	B6293053
			F				1						1						1				
"	B	R	L										1									6	"
			F																				
"	A	R	L																			11	B6294940
			F																				
"	B	R	L																	1			
			F																			11	"
"	A	R	L							1	1	1	1	1			2	2	2	1			
			F	1						1	3	2	2	1		2	3	3	2	2		12	B6257066
"	B	R	L				1			1	1	1		1		2	3	2	2				
			F				1	1	1	1	1	2	2	1		2	3	3	2	2		12	"
	TOTAL A		L				1			1	1	1	1	2			2	2	2	2		=	15 → 43
			F	1			1			1	3	2	3	1		2	3	3	3	5		=	28 → 83
	TOTAL B		L				1			1	1	1	1	1		2	3	2	3	1		=	17 → 40
			F				1	1	1	1	1	2	2	1		2	3	3	2	3		=	23
TOTAL			L																				
			F	1		2	3	1		4	6	6	7	5		6	11	10	10	11		=	83
			L																				
			F																				
			L																				
			F																				

TEST: MODEL 700 BDL DATE: 4-12-83 TESTER: FLS PG. 6 WR# 821321
MALFUNCTIONS PER ROUND OUT OF MAGAZINE.

MODEL	CLIP	SERIAL		SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL
700 BDL	A	Y	L																			5	B6361428
			F																				
"	B	Y	L																			5	"
			F																				
"	A	Y	L										1									6	B6293053
			F					2					1	1						1			
"	B	Y	L				1							1						1		6	"
			F					1					1	1						1			
"	A	Y	L																			11	B6294940
			F																				
"	B	Y	L													1						11	"
			F																				
"	A	Y	L								1		2	1		2	1	1		1		12	B6257066
			F					1		1		2	1	2		2	3	3	2	2			
"	B	Y	L							1								1	2			12	"
			F		1	1	1				1	2	1				2	1	2	3			
	TOTAL A	Y	L								1		3	1		2	1	1		1		=	10
			F					3		1		2	1	3		2	3	3	2	3		=	23
	TOTAL B	Y	L				1			1								1	2	1		=	6
			F		1	1	1	1			1	2	2	1		1	2	1	2	4		=	20
TOTAL					1	1	2	4		2	2	4	6	5		5	6	6	6	9		=	59
			L																				
			F																				
			L																				
			F																				

TEST: MODEL 700 BDL DATE: 4-12-83 TESTER: FLS PR. 5 WR# 821321

MALFUNCTIONS PER ROUND OUT OF MAGAZINE.

10 + 23 = 33
6 + 20 = 26
33 + 26 = 59

82 1321

11-13-82

MALFUNCTION BREAKDOWN

SPRINGS	RED	YELLOW	TOTAL
BDL -	83	59	142
ADL -	43	35	78
MT -	27	21	48
TOTAL -	153	115	268

SPRINGS -	RED		YELLOW		TOTAL		TOTAL ↓
AMMO -	A	B	A	B	A	B	
BDL -	32	51	16	43	48	94	142
ADL -	15	28	13	22	28	50	78
MT -	11	16	8	13	19	29	48
TOTAL -	58	95	37	78	95	173	268

FEEDING ROUND		1	2	3	4	5	TOTAL
TOTAL TEST	SLOW	15	9	9	11	18	62
	MEDIUM	19	11	11	20	29	90
	FAST	16	19	20	19	42	116
	TOTAL	50	39	40	50	89	268

MALFUNCTION BREAK DOWN

021321
4-13-82

Feeding Round		1	2	3	4	5	TOTAL
BOL	SLOW	1	1	3	5	5	15
	MED	6	8	10	13	10	47
	FAST	11	17	16	16	20	80
SUB TOTAL →		18	26	29	34	35	142
ADL	SLOW	3	1	0	6	13	23
	MED	5	1	0	6	19	31
	FAST	1	1	0	3	19	24
SUB Total →		9	3	0	15	51	78
M 7	SLOW	11	7	6	0	0	24
	MED	8	2	1	1	0	12
	FAST	4	1	4	0	3	12
Sub total →		23	10	11	1	3	48
TOTAL →		50	39	40	50	89	268

APPENDIX "B"

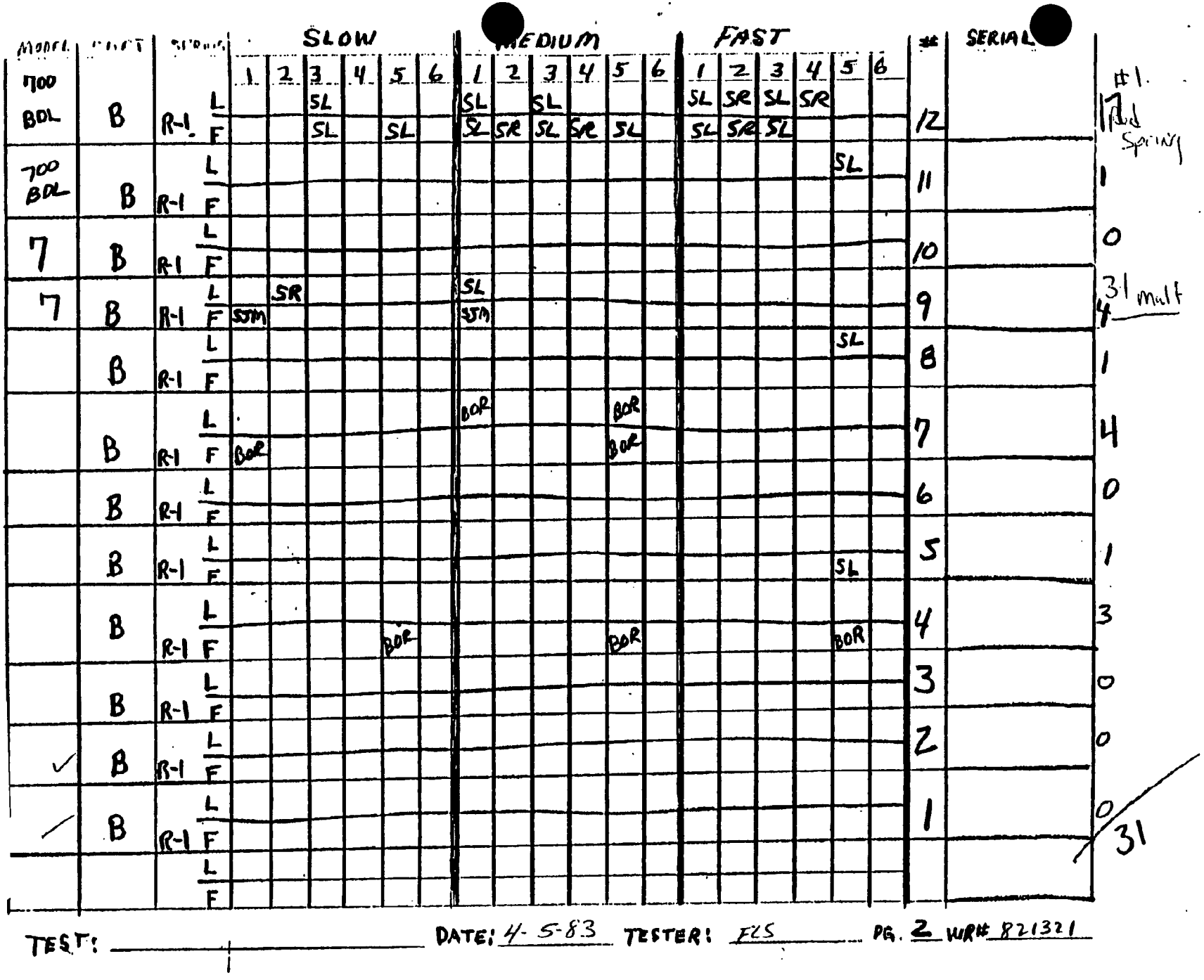
(Work Sheets)

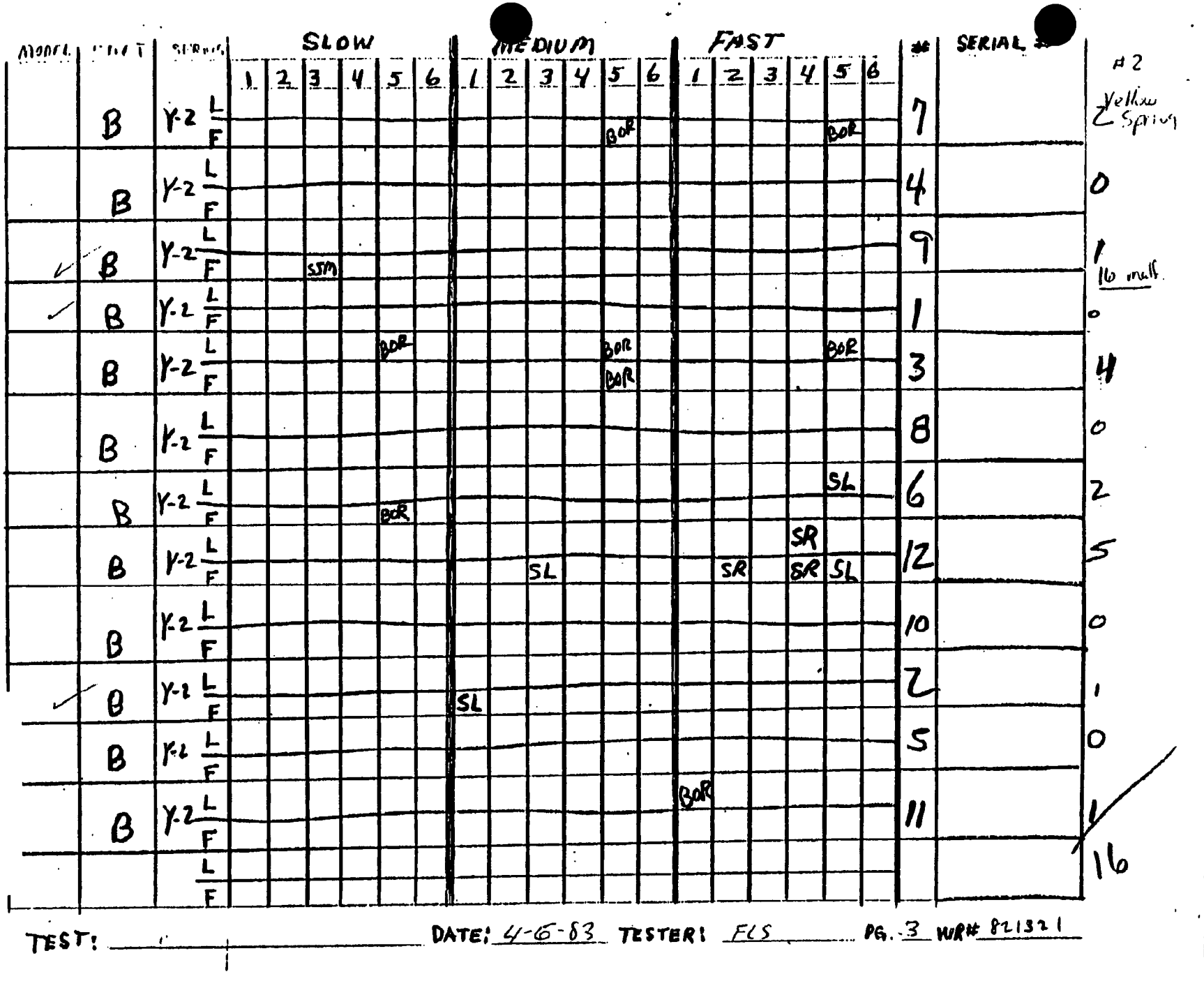
MODEL	CAST	SPRING	SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL #	
7	A	Y-1 L																			1	7602568	0
		Y-1 F																					
7	A	Y-1 L																			2	7602529	0
		F																					
700 FDL	A	Y-1 L																			3	B62993294	0
		F										SLO											
700 ADL	A	Y-1 L																	SH		4	B6257041	2
		F																					
700 BDL	A	Y-1 L																			5	B6361428	0
		F																					
700 BDL	A	Y-1 L										SLO									6	B6293053	2
		F					FTD																
700 ADL	A	Y-1 L	BOR				BOR		BOR				BOR								7	B62950Y3	5
		F					BOR																
700 ADL	A	Y-1 L																			8	B6377369	0
		F																					
7	A	Y-1 L		SJM						SJM											9	7602593	6
		F		SJM						SJM						SJM	FTD						
7	A	Y-1 L																			10	7602525	0
		F																					
700 BDL	A	Y-1 L																			11	B6294940	0
		F																					
700 BDL	A	Y-1 L										SA			SL			SL		SL	12	B6257066	12
		F					SL				SL	SR	SL		SL	SR	SL		SL	SL			27
		L																					
		F																					

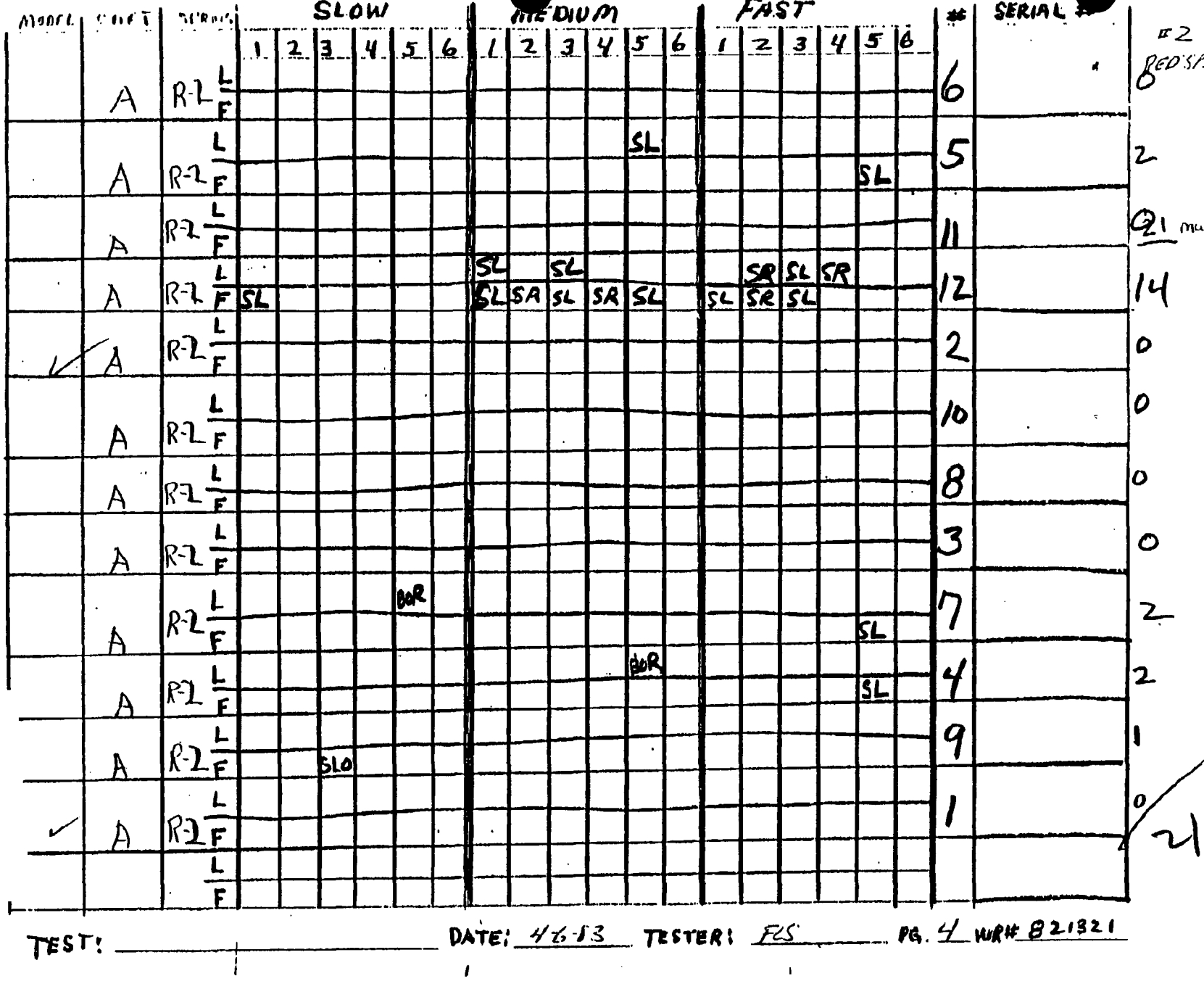
#1 Yellow Spring

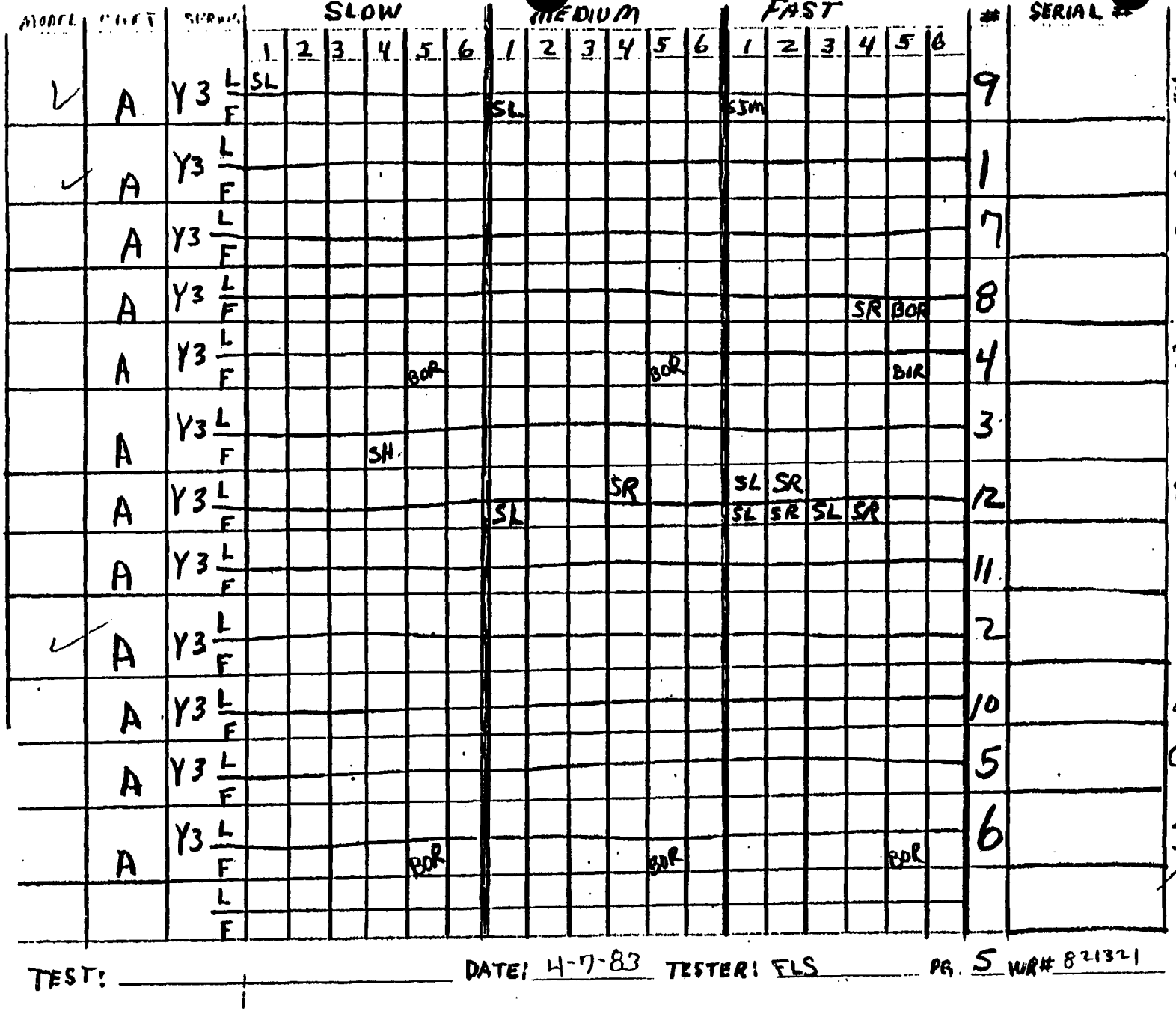
27 mcls.

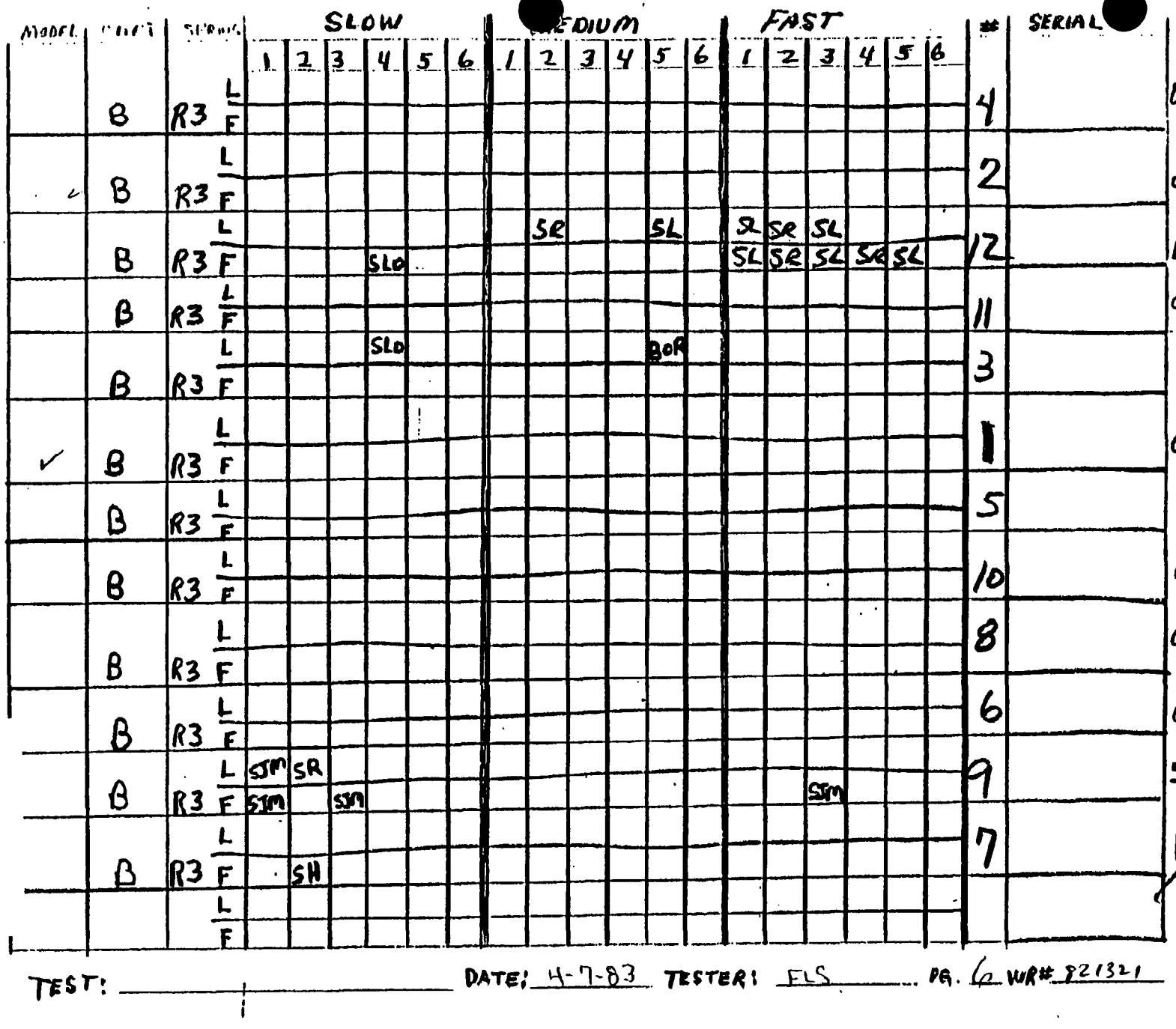
TEST: _____ DATE: 4-5-83 TESTER: ECS PG. 1 WRA 821321

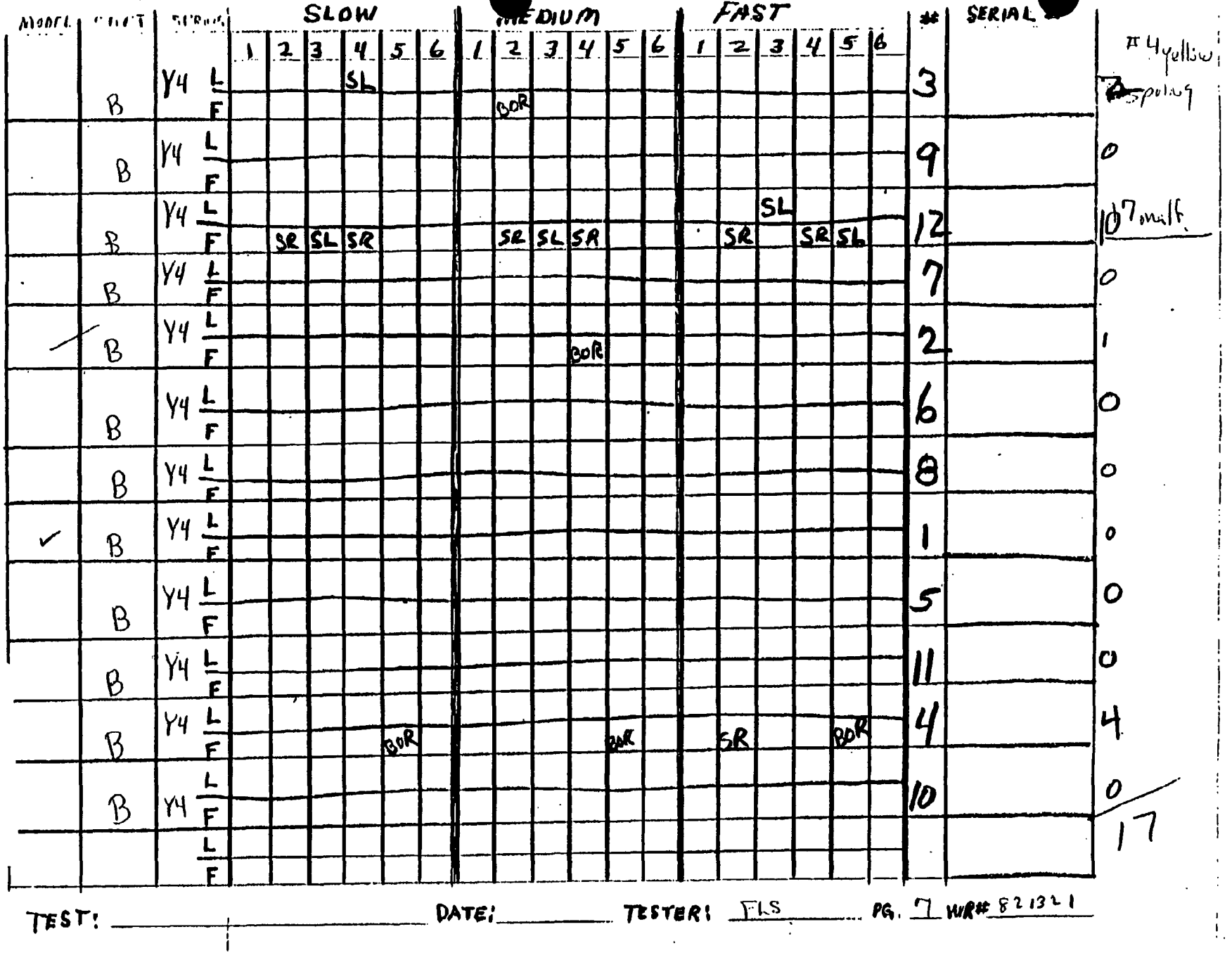


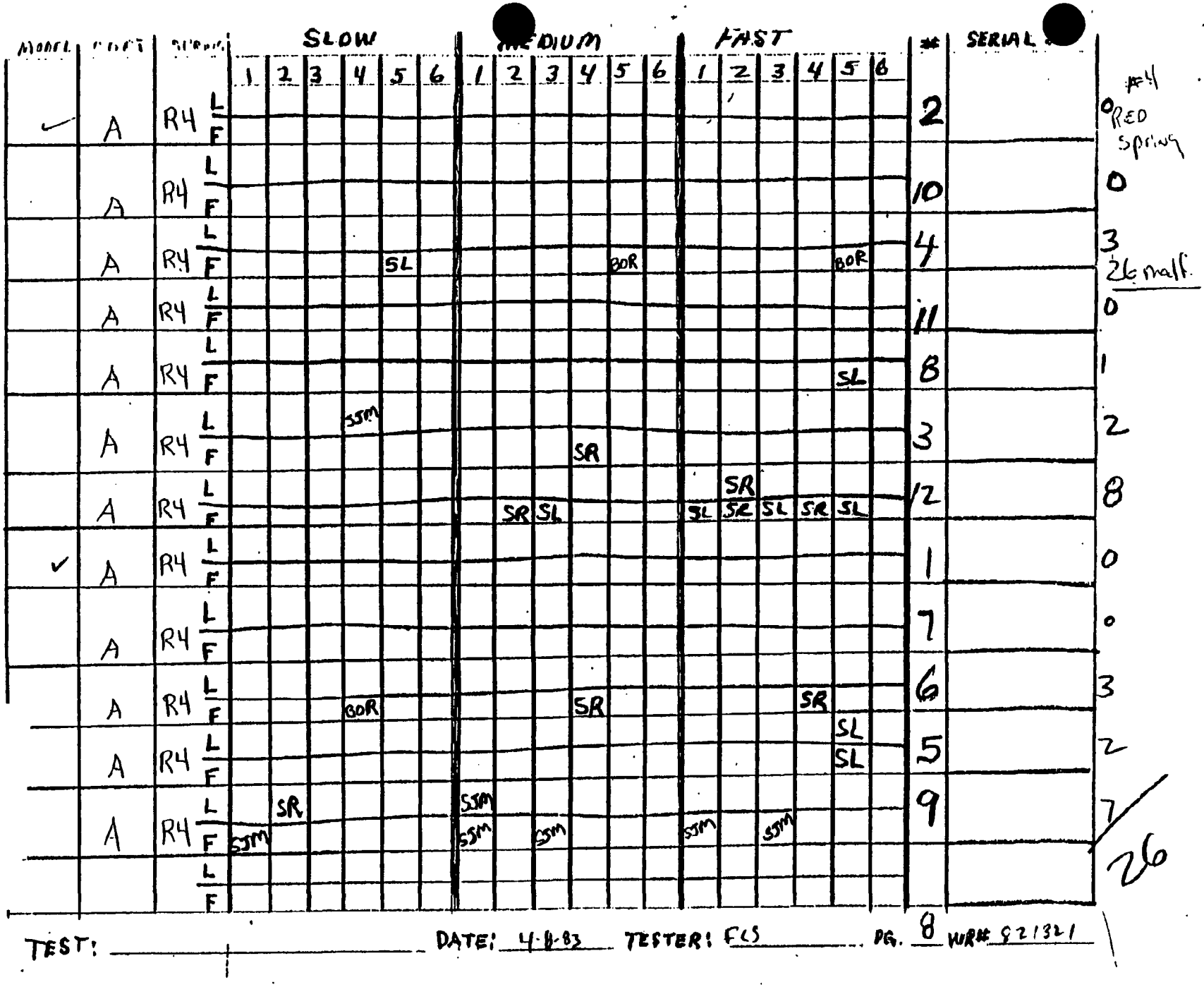


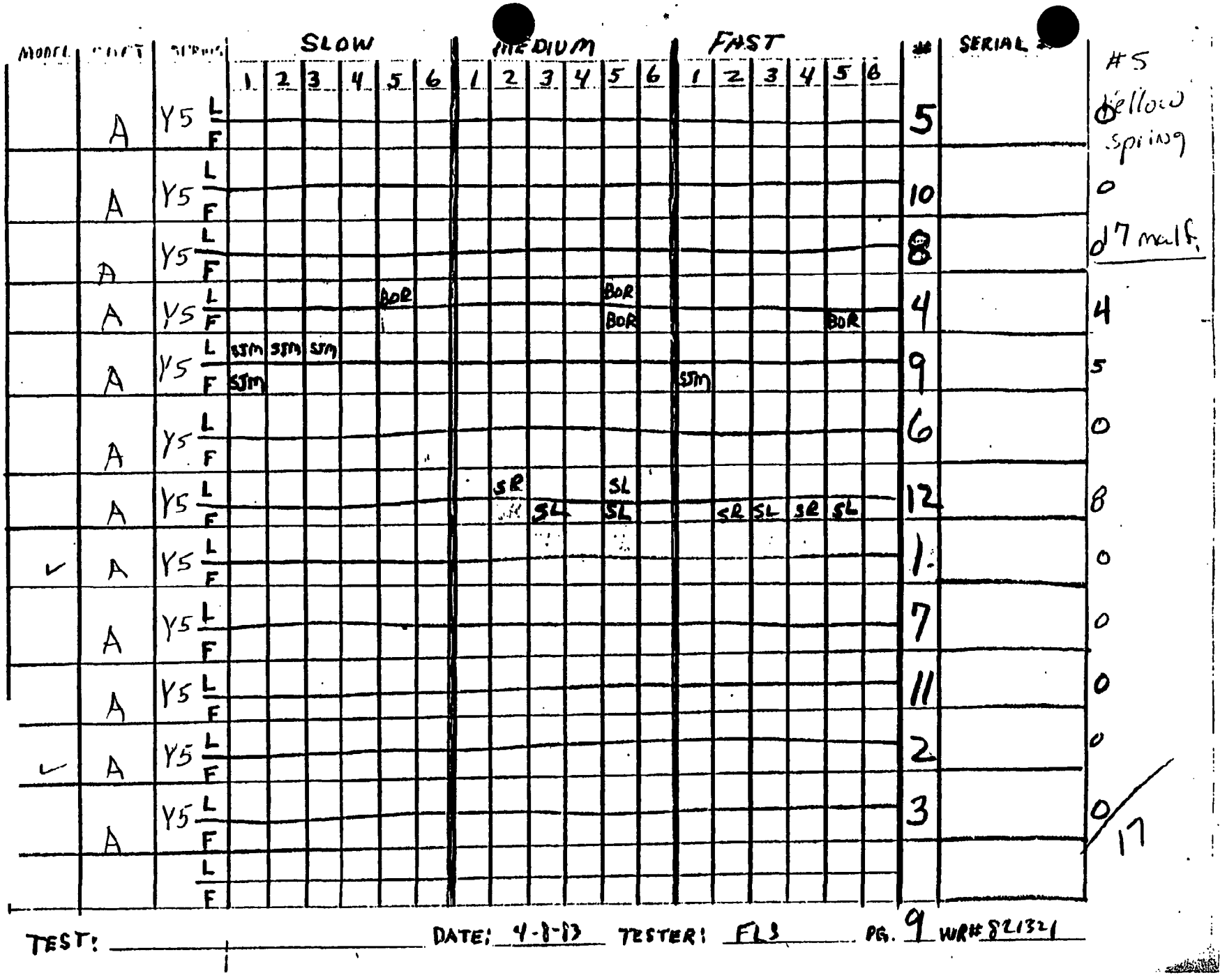


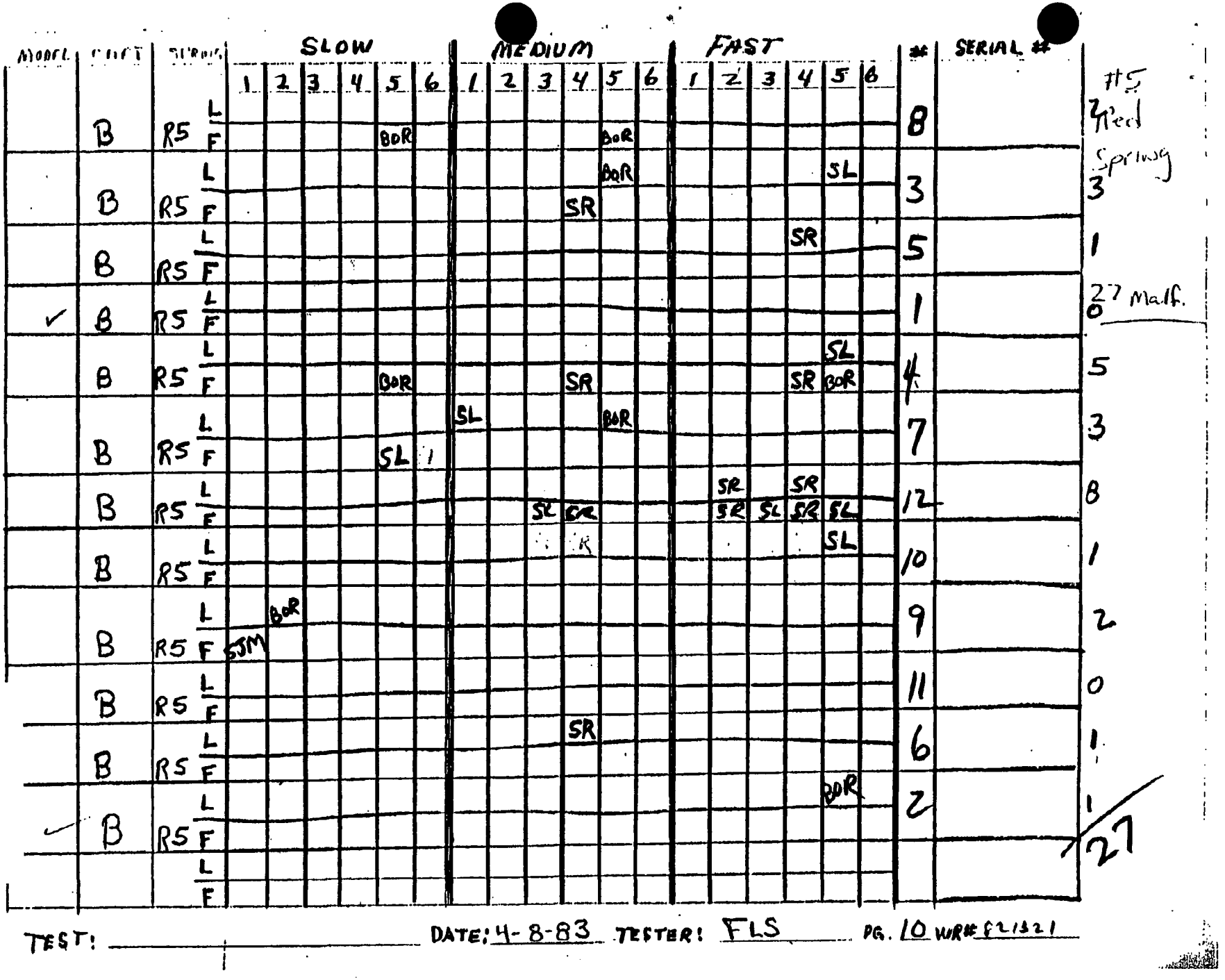












MODEL	SHAFT	SERIAL		SLOW 1	2	3	4	5	6	MEDIUM 1	2	3	4	5	6	FAST 1	2	3	4	5	6	#	SERIAL
	B	Y6	L																			10	
			F																				
	B	Y6	L							SL									SR			12	
			F															SL		SL			
	B	Y6	L	SSM			SLO						SR									3	
			F																				
	B	Y6	L																BOR			8	
			F																				
✓	B	Y6	L																			1	
			F																				
✓	B	Y6	L	SSM						SSM						SSM						9	
			F																				
	B	Y6	L				SA						SR	BOR						BOR		6	
			F																				
	B	Y6	L											BOR						BOR		4	
			F																				
	B	Y6	L																			7	
			F																				
	B	Y6	L																	SL		2	
			F																				
	B	Y6	L																			11	
			F																				
	B	Y6	L																			5	
			F																				
			L																				
			F																				

#6
4 yellow
3 Springs
3 B mail
1
0
3
4
2
0
1
0
9
18

TEST: _____ DATE: 4-11-83 TESTER: FLS PG. 11 WR# 921321