

# Test Lab Work Request Form

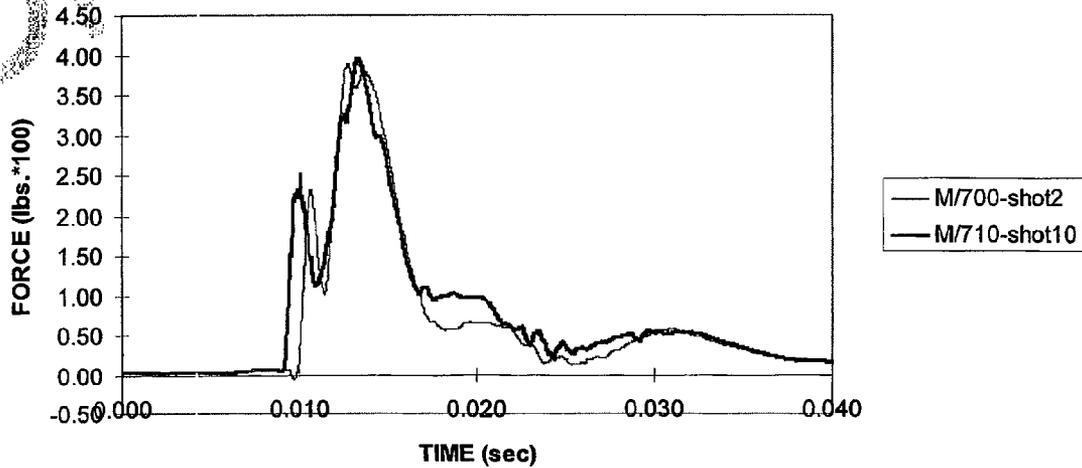
<b>Date Submitted:</b> 10 March, 2000	<b>Tracking #:</b> TLW 0010J												
<b>Project #:</b> 241095	<b>Engineer:</b> J.R.SNEDEKER												
<b>Test Objective:</b> <b><u>TLW0010J - Measure Recoil Force:</u></b>  Using the Remington designed recoil force device, measure the recoil forces for both the .30-06 and .270 caliber rifles. This test will only be done during Phase II with the synthetic stocks assembled to the actions. The measurements will be taken for information only.													
<b>Test Description:</b> <b>Method:</b> <ul style="list-style-type: none"> <li>• Assemble device to stock.</li> <li>• Shoot the test in "blow-up" range using the jack (Old Rem. Jack - light side used). Fire the rifle remotely. <del>(As an alternative, the rifle may be shot from the shoulder, with prior review of the safety status of the firearms.)</del></li> <li>• Use the round with the heaviest available factory bullet.                          Remington 180 Grain Core-Lokt Soft Point (R30064)                          Lot C 03 SC2025</li> <li>• Shoot ten rounds per sample rifle.</li> <li>• Average the ten rounds for each sample.</li> </ul> <b>Data Required:</b> <ul style="list-style-type: none"> <li>• Rifle serial number</li> </ul> <table style="margin-left: 40px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Model</th> <th style="text-align: left; border-bottom: 1px solid black;">Gun</th> <th style="text-align: left; border-bottom: 1px solid black;">Serial No.</th> <th style="text-align: left; border-bottom: 1px solid black;">Gun Weight</th> </tr> </thead> <tbody> <tr> <td>M/710</td> <td>B-8</td> <td>71001083</td> <td>7.068 lbs.</td> </tr> <tr> <td>M/700.BDL</td> <td>Control</td> <td>E5888338</td> <td>7.17 lbs.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• The peak force recorded for each shot (See attached document)</li> <li>• A plot of each shot (See attached document for sample curves)</li> <li>• The average for peak force and area under curve of the ten trials per rifle. (See attached document)</li> </ul>		Model	Gun	Serial No.	Gun Weight	M/710	B-8	71001083	7.068 lbs.	M/700.BDL	Control	E5888338	7.17 lbs.
Model	Gun	Serial No.	Gun Weight										
M/710	B-8	71001083	7.068 lbs.										
M/700.BDL	Control	E5888338	7.17 lbs.										
<b>Resource Usage:</b> Manpower Requirements - 1 Engr.+1 tech.  Facility Requirements -	<b>Test Results Required:</b> Formal Report:           Data Only: X REQUESTED Completion Date:												
<b>Required Materials/Parts/Equipment (include quantities):</b>													
<b>Test Parts Availability Date:</b>													
Start Date: 9/18/00 Completion Date: 9/19/00 Report Date: 10/17/00	<b>Test Assigned To:</b> H. Davidson												

ET06992

**TLW0010J - Measure Recoil Force**

	M/710 Curve Area (lbs.-sec.)	M/700 Curve Area (lbs.-sec.)	M/710 Peak Force (lbs.)	M/700 Peak Force (lbs.)
	3.08	2.86	396	390
	3.02	2.93	378	395
	3.10	2.93	388	396
	2.93	2.88	382	387
	3.07	2.90	390	387
	3.05	2.92	378	386
	3.08	2.93	394	404
	2.88	2.94	370	400
	2.93	2.84	378	390
	2.91	2.83	376	382
<b>Avg.</b>	3.01	2.90	383	392
<b>S.D.</b>	0.08	0.04	8	7
<b>Maximum</b>	3.10	2.94	396	404
<b>Minimum</b>	2.88	2.83	370	382

**Recoil Force Comparison (Cal. .30-06 Sprg.)**



ET06993

**TLW0010J - Measure Recoil Force**

**One-Way Analysis of Variance  
For Peak Recoil Force**

Analysis of Variance					
Source	DF	SS	MS	F	P
Factor	1	384.3	384.3	6.59	0.019
Error	18	1049.8	58.3		
Total	19	1434.1			

Individual 95% CIs For Mean  
Based on Pooled StDev

Level	N	Mean	StDev	CI	
710-Peak	10	382.96	8.47	(-----*-----)	
700-Peak	10	391.73	6.70	(-----*-----)	
Pooled StDev =		7.64		378.0	396.0

**Conclusion:**  
~~No significant statistical difference at the 95% CI between M/710 and M/700 Peak Recoil Force Data.~~

**One-Way Analysis of Variance  
For Area under Force/Time Curve**

Analysis of Variance					
Source	DF	SS	MS	F	P
Factor	1	0.05941	0.05941	13.76	0.002
Error	18	0.0769	0.00432		
Total	19	0.13710			

Individual 95% CIs For Mean  
Based on Pooled StDev

Level	N	Mean	StDev	CI	
710-Area	10	3.0050	0.0834	(-----*-----)	
700-Area	10	2.8960	0.0409	(-----*-----)	
Pooled StDev =		0.0657		2.880	3.060

**Conclusion:**  
 There is a significant statistical difference at the 95% CI between M/710 and M/700 based on Area under the Force/Time Curve Data. <sup>and Peak Recoil Force</sup> This difference is small however and is insignificant from a practical sense. ~~The average M/700 impulse data is 96.4% of that calculated for the M/710.~~ This is certainly within the measurement error of the system and is probably due to the fact that the force amplifiers drift over time and are not exactly at zero for every shot. An area calculation would tend to amplify this error more than the Peak Force calculation.