

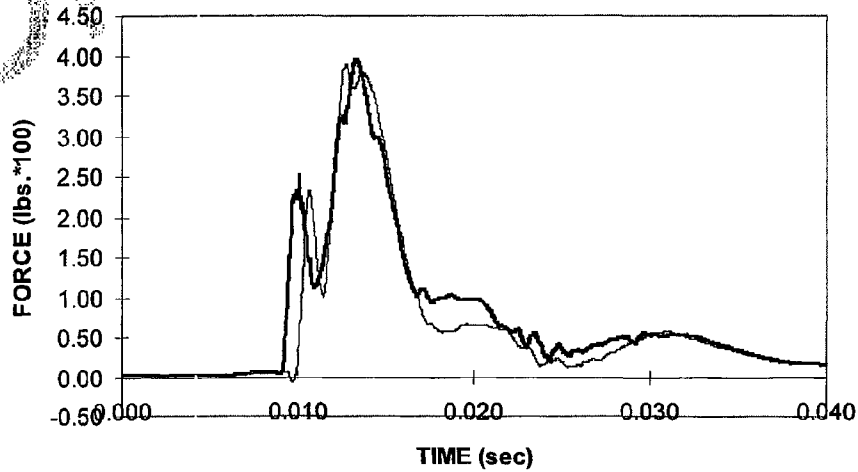
## Test Lab Work Request Form

<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>TLW0010J - Measure Recoil Force:</b> <p>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.</p>													
<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               <table border="1" style="margin-left: 40px; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Model</th> <th>Gun</th> <th>Serial No.</th> <th>Gun Weight</th> </tr> </thead> <tbody> <tr> <td>M7710</td> <td>B-8</td> <td>71001083</td> <td>7.068 lbs.</td> </tr> <tr> <td>M700 BDL</td> <td>Control</td> <td>E8888338</td> <td>7.17 lbs.</td> </tr> </tbody> </table> </li> <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	M7710	B-8	71001083	7.068 lbs.	M700 BDL	Control	E8888338	7.17 lbs.
Model	Gun	Serial No.	Gun Weight										
M7710	B-8	71001083	7.068 lbs.										
M700 BDL	Control	E8888338	7.17 lbs.										
<b>Resource Usage:</b> <b>Manpower Requirements</b> – 1 Engr.+1 tech.  <b>Facility Requirements</b> -	<b>Test Results Required:</b> <b>Formal Report:</b> <b>Data Only:</b> X <b>REQUESTED Completion Date:</b>												
<b>Required Materials/Parts/Equipment (include quantities):</b>													
<b>Test Parts Availability Date:</b>													
<b>Start Date:</b> 9/18/00 <b>Completion Date:</b> 9/19/00 <b>Report Date:</b> 10/17/00	<b>Test Assigned To:</b> H. Davidson												

ET06992

TLW0010J - Measure Recoil Force

	M/710	M/700	M/710	M/700
	Curve Area	Curve Area	Peak Force	Peak Force
	(lbs.-sec.)	(lbs.-sec.)	(lbs.)	(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
Avg.	3.01	2.90	383	392
S.D.	0.08	0.04	8	7
Maximum	3.10	2.94	396	404
Minimum	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	
710-Peak	10	382.96	8.47	(-----*-----)
700-Peak	10	391.73	6.70	(-----*-----)
Pooled StDev =	7.64			378.0 384.0 390.0 396.0

**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	0.00769	0.00432		
Total	19	0.06710			

Individual 95% CIs For Mean  
Based on Pooled StDev

Level	N	Mean	StDev	
710-Area	10	3.0050	0.0834	(-----*-----)
700-Area	10	2.8960	0.0409	(-----*-----)
Pooled StDev =	0.0657			2.880 2.940 3.000 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. 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.~~ <sup>and Peak Recoil Force</sup> 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.

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