

Snedeker, Jim

From: Danner, Dale
Sent: Friday, October 20, 2000 11:53 AM
To: Snedeker, Jim
Subject: FW: T&P 710 Mag Box Testing Results

Jim,
This report should be considered a T&P level test. Pls add to final T&P report pile for M/710.
Dale

From: Jiranek, Marlin R.
Sent: Friday, October 20, 2000 9:41 AM
To: Franz, Scott
Cc: Danner, Dale; Keeney, Mike; Zajk, Joseph J
Subject: T&P 710 Mag Box Testing Results



Magazine Box Shear
Strength Test...

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October 20, 2000

To: Scott Franz
From: Marlin Jiranek

Cc: D. Danner, M. Keeney, J. Zajk

RE: TRIAL & PILOT MAGAZINE BOX TESTING**HISTORY:**

Thirteen M/710 magazine boxes were delivered to the Remington Arms Company Research and Development Technology Center in Elizabethtown, Kentucky for weld evaluation of the T&P product. The current specification of the welded box is that no box shall fail when loaded as described in this report below 2,000 pounds of applied load. Of the thirteen boxes supplied, 10 were tested and 1 inadvertently was destroyed during set-up. There are two boxes remaining.

SUMMARY:

All 10 of the boxes tested passed the current specification criteria. The average failure load for all 10 tested magazine boxes was 3,037 lbf. The boxes were loaded in the Instron tensile testing machine as depicted in Figure 1. The first two magazine boxes tested did not fail the welds, but rather failed the magazine box material. The test set-up was then altered (for the remaining eight magazine boxes tested) by removing the small block in the bottom of the magazine box. This allowed for the failure of the weld rather than the material in six of the remaining eight magazine boxes tested. The average failure load of the last eight magazine boxes tested was 3,229 lbf.

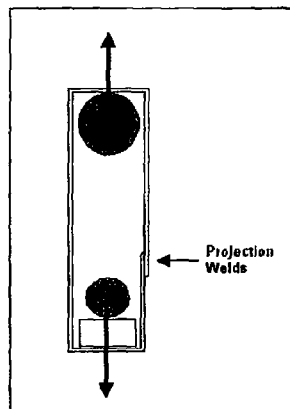


Figure 1. Schematic of the testing set-up for tensile testing the M/710 magazine boxes.

Figure 2 presents an image of one of the magazine boxes which failed the material rather than the welds. Figure 3 presents an image of a magazine box which failed both of the welds during the testing process.

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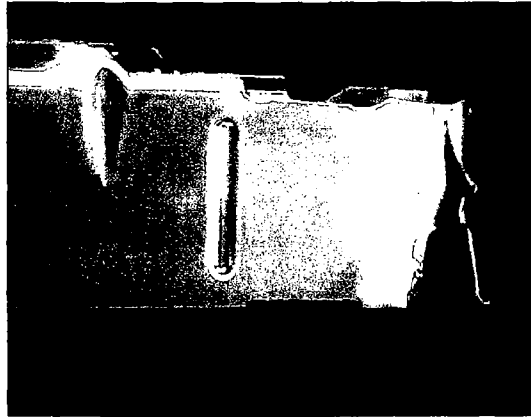


Figure 2. Image of a magazine box which did not fail the welds, but did fail the magazine box material during the weld strength testing process.



Figure 3. Image of a magazine box which did fail the welds during the weld strength testing. Note the partial failure of the material at the front of the box as well.

PROCEDURE:

A total sample of ten magazine boxes were tested to failure. As shown in Figure 1, the magazine boxes were loaded into the Instron tensile testing machine using two pins which passed through the ends of the magazine box and a small block which was meant to keep the front of the box square under the loading conditions.

The welds were strong enough, however, to allow the magazine box to deform around the block and tear along the front edge of the magazine box. An example of this type of failure is shown in Figure 2. By removing the block, the magazine box was allowed to deform around the two fixture pins. Once the magazine box had conformed to this geometry, the applied load increased with the displacement until the welds ultimately failed.

RESULTS:

Table 1 presents the maximum load obtained prior to failure of each of the magazine boxes as tested. This table also included the average, standard deviation, and the average minus three standard deviations for all ten boxes as well as for the last eight boxes tested (after the set-up change was performed).

M/710 Magazine Box Weld Shear Test			
Box No.	Maximum Load at Failure (lb.)	Box No.	Maximum Load at Failure (lb.)
1	2,354	6	2,820
2	2,184	7	3,285
3	3,029	8	3,393
4	3,166	9	3,321
5	3,624	10	3,197
3,037	10 Box Average	3,229	8 Box Average
459	10 Box St. Dev.	241	8 Box St. Dev.
1,660	10 Box $\mu-3\sigma$	2,506	8 Box $\mu-3\sigma$

Table 1. Individual testing results of each of the ten magazine boxes evaluated for weld strength.

Figure 4 presents an graph of a typical load / displacement curve for the weld strength testing. This graph has the key characteristics of the weld strength testing labeled directly in the regions of interest. These included the magazine box deformation (when the box deforms around the two fixture pins), the failure of the first of the two welds, and the failure of the second weld. This particular curve is of magazine box number 8.

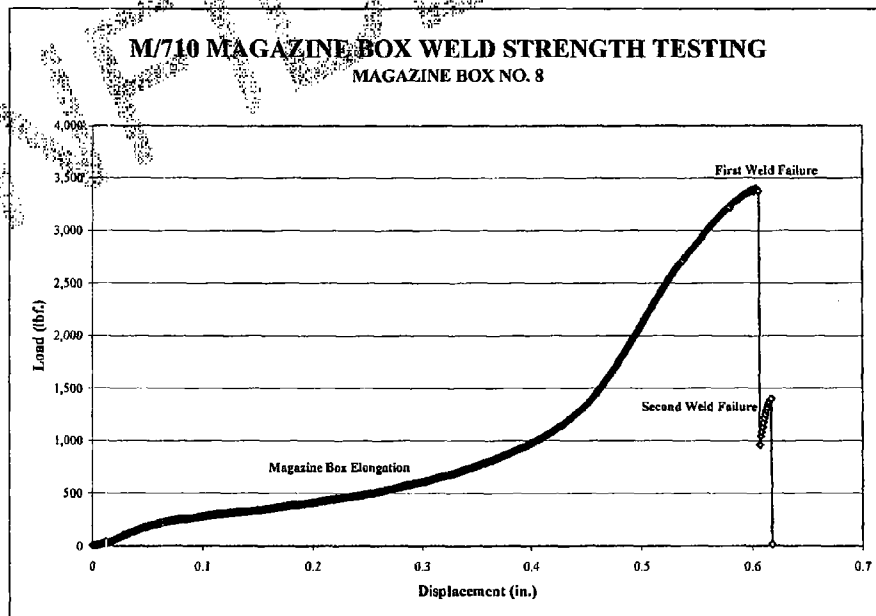


Figure 4. Load / displacement graph of test magazine box number 8.