

Shot Peening and Spring Life — All Leaves Are Critical

Bulletin #2046

OEM Quality

For many years, every major OEM manufacturer has specified shot peening of all leaves on their multileaf passenger car, truck and trailer springs. Very simply, if your spring supplier does not shot peen their springs or shot peens only the first two or three leaves, their springs are not up to OEM quality standards. Dayton Parts has and will continue to shot peen.

The Benefits

Many of you have been told about the benefits of shot peened springs for enhancing spring performance.

1. Increased spring fatigue life.
2. "Healing" over of small surface defects.
3. Surface cleaning for important paint adhesion to reduce corrosion.

But, up until now, very little hard evidence has been made available to you showing the importance of shot peening. For this reason, the following tests were run.

The Tests

For the first test, ten 83-115 springs were taken from a Dayton Parts production run. The springs were made from the same steel lot, heat treated within minutes of each other and assembled by the same fitter. The only difference between the springs is five were shot peened to Dayton's standard shot peen specification and five were not shot peened at all.

In a standard fatigue test using Reyco hangers mounted on Dayton's electronically controlled tester the springs were each cycled (flexed) until any one leaf cracked or broke.

Test Results:

Average spring life of the non-shot peened springs:
— 34,579 cycles to failure

Average spring life of the shot peened springs:
— 127,610 cycles to failure

The shot peened springs lasted over 3 1/2 times longer than the non-shot peened springs. One of the non-shot peened springs was run for 125,777 cycles to check what would happen if it were run as long as the average life of a shot peen spring. Six leaves failed compared to one leaf for the shot peened springs.

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Summary

1. The springs were identical except for the shot peening.
2. Shot peening improved the spring life by over 3 1/2 times.
3. Shot peening only the first 2 or 3 leaves would not have improved spring life since these were not the leaves that failed.
4. Running the non-shot peened spring as long as the shot peened springs resulted in 6 failed leaves instead of 1.

The Second Test

In the second test, five American made 83-115 springs were purchased from one of our major competitors in order to demonstrate the importance of shot peening each leaf, not just those thought to be critical. This competitor shot peened only the first three leaves. These springs were tested using the same method used in the first test.

Test results:

Average spring life of the competitors springs:

— 56,993 cycles to failure

Below is a summary of the fatigue test results on the 83-115 springs done to date.

Supplier	Leaves Shot Peened	Cycles to Failure	Number of Failed Leaves
Dayton	None	34,579	1
Dayton	All	127,610	1
Supplier "X"	1,2 & 3 only	56,993	3 (average)

FOR MAXIMUM SPRING LIFE, ALL LEAVES ARE CRITICAL NOT JUST THE FIRST 2 OR 3.

CHECK THE SHOT PEENING COMMITMENT OF YOUR SPRING SUPPLIER. Remove the center bolt and compare the surface of each leaf to that of a shot peened leaf to verify how many leaves were shot peened. This will quickly show their commitment to selling the quality of springs you and your customers deserve.

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