



Los Alamos National Laboratory Project: Evaluation of Z-Coil Running Shoes

Purpose

This document is intended to provide the reader with an overview of research performed at Los Alamos National Laboratory (the Laboratory), ESA-DE, under the auspices of the Laboratory's Industrial Partnership Office. The information and data in this document is intended to be an objective presentation of the results of the research performed. It is not the Laboratory's intention that this document be interpreted as an endorsement of the products mentioned herein.

Conclusions

The pulse curves for the Recoil running shoes were typically of longer total duration than the curves for the elastomer cushioned running shoe. Pulse durations were observed to be as much as 50% longer for the Recoil shoes in some cases. This was particularly true for the lower energy impacts that would be typical of relatively light weight runners (100-150 lbs.) or heavier runners with relatively little vertical displacement in their running style (<2 inches).

The longer duration pulse curves for the Recoil shoes were due to the curves being generally more bell-shaped than the curves generated by the elastomer cushioned running shoe. The curves for the typical running shoe tended to have a steeper slope at the onset of the shock pulse and lacked the transitional slope that was observed in the curves for the Recoil running shoes. This was interpreted to represent a more gradual onset of shock forces in the Recoil shoes as compared to the elastomer cushioned running shoe.

The energy return levels of the Recoil running shoes were not specifically measured as part of the testing procedures. This was due to a lack of high speed video equipment that would be required to precisely quantify the energy return levels. However, based on the magnitude of the second impact pulse seen on several of the pulse plots, it can be stated with relative certainty that the energy return for the Recoil running shoes falls somewhere in the range of 40% - 50%.

Summary

The data obtained in this project seems to indicate one area in which the design of the Recoil shoe may be an improvement over that of the typical elastomer cushioned running shoe. The initial impact forces appear to be less abrupt in the Recoil shoes, resulting in a reduction of the jarring effect to the foot and the lower leg of a runner as the heel impacts the ground. The fact that the peak forces are equivalent to those of the traditional running shoe may be offset by the longer period of time required to reach these peaks after initial impact.