

When ARA Engineering Went Looking For The Sweet Spot...

THE CUSTOMER

NE/Nastran was used by ARA Engineering Inc. of Mesa, AZ to optimize the design of a golf putter.

THE CHALLENGE

The existing putter prototype produced an unusual audible tone when striking the ball. This tone was inconsistent with putters currently on the market place. More importantly the sound did not inspire confidence in the user. The goal of the NE/Nastran FEA analysis was to determine how to eliminate this sound with minimal changes in putter geometry and performance.

THE SOLUTION

NE/Nastran was used to perform a transient response impact analysis on the putter prototype. It was found that the toe-heel bend and twist was responsible for post strike vibrations causing the undesirable sound. The NE/Nastran results closely matched actual test data generated in the lab.

Rapid sound dampening was the recommended course of action to eliminate the undesired tone. Stiffening of the central section beneath the plastic over mold and additional plastic over-molding served to correct the problem.

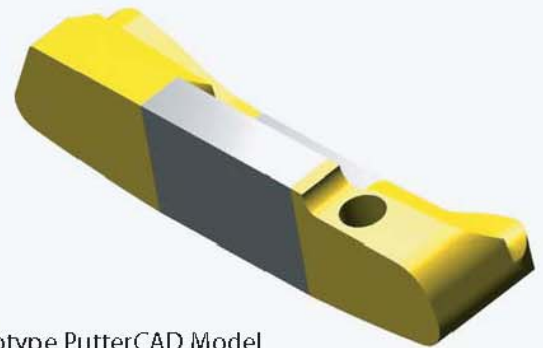
THE RESULTS

Putter	Data Source	% Decay at 15 ms
Prototype Putter	Lab Measurement	31%
Prototype Putter	Virtual Model	25%
Successful Putter	Lab Measurement	<3%
Optimized Putter	Virtual Model	5%

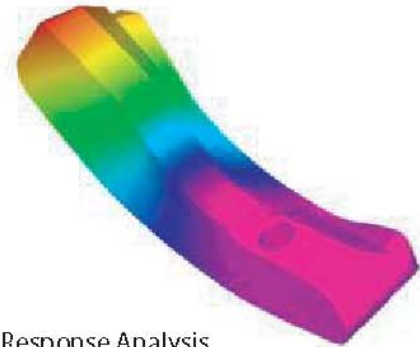
These design and frequency changes resulted in rapid sound decay and a quiet, more pleasing tone when striking the ball. Utilization of NE/Nastran produced a final product that was more marketable without significant performance changes or construction of costly prototypes.

CASE STUDY:

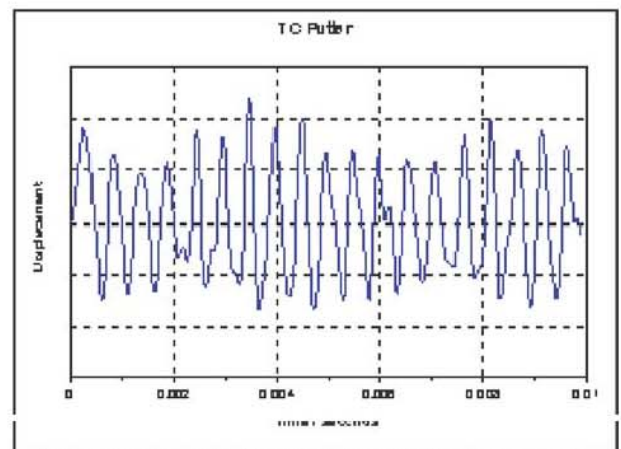
Prototype Golf Putter Optimization
ARA Engineering, Inc.



Prototype PutterCAD Model



Transient Response Analysis



They chose NE/NASTRAN
.... why shouldn't you?

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