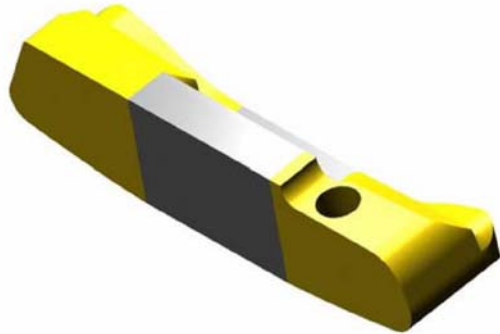
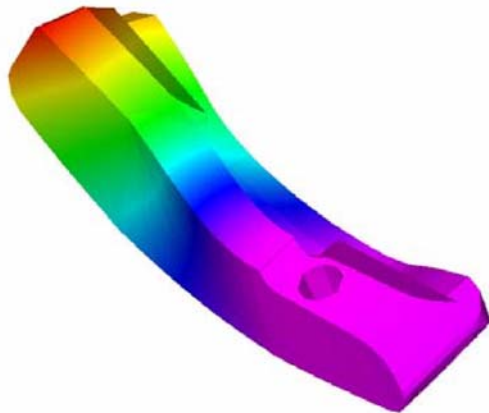




Product Case Study (ARA Engineering, Inc. - Golf Putter)



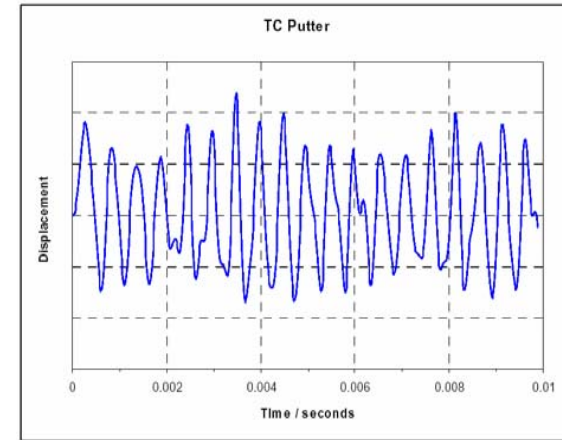
NEi Nastran was used by ARA Engineering Inc. (www.ara-eng.com) of Mesa, AZ to optimize the design of a golf putter (upper left). The existing putter prototype produced an unusual audible tone when striking the ball. This tone was inconsistent with putters currently on the market place. More importantly, the sound did not inspire confidence in the user. The goal of the NEi Nastran FEA analysis was to determine how to eliminate this sound with minimal changes in putter geometry and performance.



NEi Nastran was used to perform a transient response impact analysis on the putter prototype (lower left). It was found that the toe-heel bend and twist was responsible for post strike vibrations causing the undesirable sound (upper right). The NEi 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.

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



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%

NEi Software, Inc. is aggressively focused on commitment to the customer. Detailed documentation, customized on-site training, and comprehensive technical support ensures that you will see immediate return on your investment.

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