Application Note

Industry: Woodworking

Application: Linear Motion CNC Surfboard Shaping Machine

Challenges:

- Eliminate vibration over multi-axes movement
- Control accuracy over long lengths
- Maintain precise motion rigidity without speed loss

Situation

A surfboard design studio wanted to develop and build a compact and low maintenance surfboard shaping machine that provided a faster, measurable ROI for its customers.

Problem

The surf board machine needed to cut and shape the boards' polyurethane and expanded polystyrene (EPS) surfboard blanks precisely over very long lengths and multiple axes. Typical surfboard belt-driven machines have two pulleys, a planetary gearhead and a ballscrew actuator, but over long lengths this system would start to vibrate which created faulty boards. Any minute concave or convex change in the hull would dramatically affect the board's performance so the blanks also had to be held perfectly rigid.

Solution

The design studio added Moog Animatics' Harmonic Linear Drive (HLD60-H3) and belt-type linear actuator with a built-in SmartMotor to its machine design. The HLD60-H3 combines six pulleys and uses the resulting harmonic principle to accomplish internal gear reduction and braking without a gearhead, which allowed the machine to maintain speed and eliminate vibration.

The six pulley gears were slightly different in size which created planetary gearhead capability and gear reduction by itself. The belt module was also more precise over very long lengths, and had unidirectional repeatability of less than 22 µm over 3.2M.