

Computerized Router Turns Yoga Instructor's Labor of Love into Profitable Exercise Machine

A well-known Yoga instructor helped express his artistic talent at a commercial level by turning a new exercise machine concept into a profitable business with the help of a Techno CNC router. The new concept involves wooden, multipurpose exercise machines that are designed to simulate the movements used in ballet, swimming, gymnastics and yoga. When Juliu Horvath began designing these machines about 10 years ago, he built them with a jig saw and templates. Each machine took so long to build by this approach that it

seemed impossible to build a profitable business from his concept. Several years ago, however, he switched to a Techno computerized router that has allowed him to cut the time required to build the machines by 80% and turn what was previously merely a labor of love into a growing business.

Horvath began his career as a ballet dancer in Romania and defected to the United States in the late 1960's. Not long after his arrival, he gave up dance to pursue the study of Yoga. He developed a Yoga system based on the underlying principle of translating

breathing patterns to movement patterns. Teachers and students from all over the world continue to flock to his studio in New York City to learn his original Yoga system. Horvath's system includes a unique series of floor exercises designed to enhance flexibility while increasing strength. Finding that many students had difficulty learning these exercises, he began building wooden machines to make it easier to perform them. "I saw that existing exercise machines were too rough and too linear," Horvath says. "Length and breadth were missing. They made it hard to build coordination and flexibility."

Horvath's machines incorporate the kind of sweeping organic curves one expects to find in Art Nouveau furniture. The platforms are curved in the Santa Cruz style of wavy red and blond woodwork and patterned after the swirling shapes of bonsai trees. They are created to command a "melodic movement" that increases the individual's effective range of motion. According to Horvath, "My machines are designed for athletes, dancers and health conscious people, not body builders." While the concept was developed in the mid-1980s, it took until 1994 to develop the design to absolute fullness, including determining the exact proportions to fit any body type.

Horvath set up the first machines in his Yoga studio in New York City called White Cloud Studio. The machines, which he calls the Gyrotonics Expansion System, developed an almost cult-like following from the very start among the New York dance



community and since then the system has won followers worldwide at affiliated studios in Los Angeles, London, Paris, Seattle, Munich, Mexico City and Florence. While the system was originally conceived for dancers, it has proven equally successful with children, the elderly, and those recovering from injuries and illness.

The Gyrotonics Expansion System is a patented design that uses hand- and foot-operated wheel bases and pulley suspensions to precisely hone the body through some 130 variations on 50 different sets of exercises. Workouts typically last between one and two hours and consist of slow turns synchronized with rhythmically-released deep breaths. Weights used are much lower than typical exercise machines – generally on the order of 30 pounds.

Horvath builds each machine himself, and this is a key selling feature of the equipment. The base and support elements are made of wood while other components are machined aluminum. In the beginning, Horvath built wooden components with a jig saw, using intricate templates to guide his hands, and heavily sanded each piece after cutting. There were two problems with this approach. It took so long to build each machine that, considering his other time commitments, Horvath was precluded from turning the exercise machines into a serious business. Second, the lack of precision provided by jig saw cutting meant that the components of each machine had to be individually fitted.

Then, about five years ago, Horvath heard about the Techno computer-controlled router that can produce wooden components in far less time than a jig saw. The 3-axis gantry router

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from Techno follows a pattern that is programmed with a drawing program. Rather than tediously trace the contours of the template, Horvath can now simply put a piece of wood on the Techno router and flip the switch. It produces parts in about 1/5 the time required on a jig saw. A key advantage is that the router can generate a 3-axis motion. This means that operations such as rounding the edges of a part, which would normally be done in a second operation after jigsawing, can now be accomplished in a single setup.

The accuracy of the computer-controlled router is also far greater, which provides additional time savings. The Techno system has an accuracy of ± 0.1 mm ($\pm .004$ ") in 300 mm and a repeatability of ± 0.01 mm ($.0004$ "). This precision eliminates the need for most manual finishing operations and for individually fitting components. It makes it possible to build more accurate and better looking parts that are interchangeable with each other.

The Techno router was relatively inexpensive. Horvath estimates that he paid for its cost last year in one single order for five machines. Horvath himself is computer-illiterate, but he has a friend who converts his sketches into AutoCAD drawings then uses a CNC programming package called Mastercam to produce a file that the router understands. Once the program is finished, Horvath operates the machine in his workshop. When he wants to produce a part, he simply loads a piece of wood and pushes a few buttons to start the machine. He does nearly all the manufacturing work

himself, although he does use part-time employees from time to time.

Techno routers have antibacklash ball screws for play-free motion that make it possible to produce circles that are accurate to the .0005 inch machine resolution. These ball screws also make it possible to produce wooden parts as accurate as the machine resolution. The ball screws have excellent power transmission due to the rolling-ball contact between the nut and screws. This type of contact also ensures low friction, low wear and long life.

In five years of operation, Horvath has never had any problems with the machine. This is partly due to the strength and rigidity of the table. The Techno machine is constructed from extruded aluminum profiles that can support all the materials that Horvath uses and provides easy clamping capability. The machine also has four ground and hardened steel shafts and eight recirculating bearings in each axis. This shaft and bearing system produces very smooth play-free motion and an extremely rigid system that produces high-quality cuts.

All in all, since purchasing the new router, Horvath has been able to turn his exercise machine concept into a profitable business venture. The precision and repeatability of the router makes it possible for him to perform all production work himself and will make it easy to delegate manufacturing to others, if required by future growth, without sacrificing quality.