



Van Horn Aviation

*Manufacturers of Composite
Helicopter Rotor Blades With the Help
of Ellison Machinery Machine Tools*



Major helicopter manufacturers, including Sikorsky, Boeing, Lockheed Martin, Bell Helicopter, and MD Helicopters, have long recognized the benefits of composites in aircraft components. In fact, in today's military rotorcraft, composites regularly constitute 50 to 80 percent -- or more -- of the airframe by weight.

But in helicopters built for the civil aviation sector, composite application varies much more widely. Several manufacturers attribute their reluctance to expand composite use in rotorcraft to certification rules imposed by the FAA, whose more stringent requirements for composites inflate costs and overtax the smaller R&D budgets available.

Van Horn Aviation (VHA) was founded by mechanical engineer and former U.S. Army helicopter pilot James 'Jim' Van Horn in 2001. Formerly the chief engineer for McDonnell Douglas on its MD500 line, Van Horn founded VHA to improve the performance of rotor blade systems in civil aviation helicopters through superior design, engineering and manufacturing processes using composites. VHA holds FAA STCs (Supplemental Type Certificates) for their products. FAA STCs are issued when an applicant has received FAA approval to modify an aircraft from its original design. The STC approves not only the modification but also how that modification affects the original design.



VHA General Manager Dean Rosenlof, an aeronautical engineer who met Jim shortly before graduating from Embry-Riddle Aeronautical University in 1995, says, "The large helicopter manufacturers continue to innovate on new helicopters, and these are the helicopters used extensively in the military. But in other industry segments, where budgets are much smaller, older helicopters are still a mainstay. And the large helicopter manufacturers aren't typically allocating their R&D budgets in this segment. VHA's goal is to improve the performance of light utility working legacy helicopters that are used in such applications as forest fighting, moving heavy equipment, crop dusting, and Medevac. The buyers and owners of these helicopters are looking for performance and cost improvements, and are working with small budgets."

With an experienced engineering team, and a small lean business mentality, Dean says that VHA can offer its products more cost effectively than the larger OEMs. Until recently, their product line consisted of composite tail rotor blades. With FAA regulations requiring the sheet metal rotor blades to be replaced after 2500 hours, VHA's composite aftermarket tail rotor blades are ruggedly designed with a service life of double that, for 5000 hours. Dean says that with a cost roughly equivalent to the OEM's replacement sheet metal rotor blades, VHA is not only saving the helicopter owner costs over the life of the blades, but he/she is realizing additional benefits with the composite rotor blade replacement, including a toughened more aerodynamic design, increased corrosion resistance, noise reduction, better fuel efficiency, and greater part-for-part consistency.

Today VHA manufactures composite tail rotor blades for the 206/OH-58 and UH-1 Huey series of aircraft. VHA is also currently developing new composite main and tail rotor blade designs for various helicopters.



Just recently, the company signed a Memorandum of Understanding (MOU) with Bell Helicopter Textron Inc. for its 412/212 rotor blades. Under the MOU, VHA will design, certify and manufacture composite tail rotor blades to supply the Bell 412/212 product lines.

“Our 412/212 tail rotor blades will share many of the same qualities of our proven 206 tail rotor blades, including a robust composite design and efficient airfoil,” said VHA president James Van Horn.



VHA has expanded over the years, growing from a 1 bay to a 4 bay facility. In 2011, the company purchased a 24,000 square foot facility to house their operations. Dean says the company purchased additional land adjacent to their current facility that will enable continued growth as needed.

VHA is equipped to do complete design and manufacturing in-house, with such state-of-the-art equipment as a freezer, an oven, a waterjet, paint and sand booths, and a number of machining centers.

The company purchased their first machining center, a Haas VF-4, from Ellison Machinery about 5 years ago and has since added 3 more to their production line. Dean says the philosophy at VHA has been to stick with the same platform. “We like the consistency of working with 1 machine; it affords us a consistent interface and tooling. Even more importantly, we’ve been extremely pleased with Ellison Machinery, from their product line, to their service, to their expertise.”

More recently, the company is doing larger tooling for their main rotor blade product design. Lead Machinist Kelly Lessley says, “We needed a gantry router for this, and we purchased the Haas CNC Vertical Gantry GR 712. It worked right out of the box like a champ, and it only took 2 days from install to cutting.”

With an increase in their titanium machining for the newest rotor blades, VHA turned to Ellison again for a solution to handle the increasing demand. Kelly says, “We chose the DMG/Mori Seiki NHX4000 from Ellison Machinery. The NHX4000 horizontal machining center is a 4-axis machine with a 60-tool capacity and is ideal for the machining our production titanium parts. With the pallet system, we can do all of our set-ups offline, which results in a significant time savings. With our 2 pallets, each holding 8 parts, we can machine 16 parts simultaneously”

Dean and Kelly admit that they didn’t look at other machine tool dealers when making their latest purchases. “We probably have 100 suppliers,” Dean said, “and Jason McCurdy, our Ellison Machinery Sales Engineer, and the whole team at Ellison, make it so easy to stick with them. We don’t have a need or desire to look elsewhere for our machine tools.” Kelly added, “It is very hard to find a company like Ellison Machinery. The machine world, including the tooling and fixtures, is changing so rapidly. We can’t possibly stay on top of the latest innovations and do our jobs, but Ellison Machinery can. And they do. They have the knowledge of who to go to for everything we need to maximize our manufacturing productivity.” Jason McCurdy reflects the same commitment to the relationship, “VHA has been a valued partner over the last 5 years. From the family work environment that Jim and Dean have created to the professionalism of each employee, it has been my pleasure to work with their organization and I look forward to our future together.”

For more information on Ellison Machinery Co, please call (480) 968-5335 or visit their website at ellisonaz.com.

To learn more about VHA’s superior composite rotor blades, contact them at (480) 483-4202 or visit www.vanhornaviation.com.