

KR-2 Time

We take stock of Rand-Robinson KR-2 builders and find them a distinctive crew.

BY DON DOWNIE

Builders of the Rand-Robinson KR series really enjoy sharing data about their aircraft. After surveying the KR-1 builders in the March issue, we look this month at what the two-place KR-2 pilots have to say about their airplanes, which come in a few different flavors.

In addition to the basic KR-2, there's the new KR-2S, a stretched version with 16 inches more fuselage length, available with either conventional or tricycle gear. The KR-2S also has 2.3 feet more span and 10% more wing area. A new molded canopy and turtledeck that adds passenger and baggage space is also available. The factory reports an increase of requests for the "S" drawings from builders who were already started on the shorter version.

Dan Diehl

Landing Gear, Extended Wing

"I graduated from Oklahoma State University in 1975 and the KR had just been introduced," said Dan Diehl of Jenks, Oklahoma. "I loved the performance and the looks. I was 21, single, living with my folks and working as a machinist. In the early days, the KR was a plans-only project with some landing-gear parts available. I worked at least 40 hours a week on the plane and flew it in eight months. My KR-2 was the first to fly and the third one built. It cost me \$4300 complete."

Diehl has operated Fiberglass Components Co. for the past 15 years. Along the way, he teamed with Butch Koppe to design and build the XTC Hydrolite. He developed the first mold-

ed cowl for the KR's as well as an accessory case for the 2180-cc VW engine he used on his KR-2. He has sold more than 1300 of these units to VW builders.

"The KR was designed to be cheap and easy to build—and it was," said Diehl. "However, most people will spend a few bucks more for luxury. My modifications have included a new instrument panel, replacement of the retractable gear with a fixed gear, hydraulic brakes, redesigned tailwheel assembly and premolded wings with fuel tanks. I deviated from the plans on the canopy because my Dad and I are more than 6 feet tall and we needed more head room."

The original KR retractable landing gear was designed for 800 pounds gross weight and most KR's are running to 1200 pounds, according to Diehl. He wrote, "With the heavier weight—due mostly to bigger engines, more fuel, more avionics and fatter pilots—most everyone is going to hydraulic brakes and the more-durable fixed gear."

"I was one of the lucky builders who was able to know Ken Rand. He was a genius of simplicity," said Diehl. "When I would call and ask him something, he could tell me what I needed to know in seconds. He could relate a problem to something anybody could understand."

Diehl has flown his KR-2 more than 1400 hours. For the past 10 years, he has used a firewall-forward engine kit from Great Plains Aircraft Supply Co. "Great Plains builds a reliable, fair-priced VW engine," he said. "The KR is a good airplane and I feel comfort-

able with it. Kept dry, my KR should be flying for another 17 years and I'll probably be at the stick."

Robert E. Muse

An Almost-Stock KR-2.

"The type of construction on the KR-2 was just like the model airplanes I used to build. I liked the configuration and the low cost," explained Robert Muse, a 70-year-old retired Air Force civil-service employee. To build his plane, Muse purchased spruce from British Columbia, plywood from Massachusetts, foam, epoxy and 4130 tubing from Atlanta, and aluminum from Rand Robinson. He used no prefab parts and didn't keep track of building time on his KR-2.

"The plans are easy to follow. Follow them," said the first-time builder. "As you think about modifications, consider maintenance and inspection." However, he did curve the wingtips on his plane to dissipate vortex.

Muse built his own propeller and bought parts for his 2100-cc VW from a local foreign auto dealer. His cost, less engine and prop, was \$2874, but he says that he has some extra hardware left over. He has a homebuilt RST 720-channel navcom, Bendix/King loran and transponder. He said that he received all the builder support that he asked for. "The KR family of builders are real helpers. Although none of it was particularly difficult, starting a layup was something I had not done before and it took a little getting used to. My canopy is different than most. I sat in the cockpit with a cardboard behind my head. My wife then traced



David Carroll selected and built the KR-2 because of the performance-to-cost ratio. He says it is a good-flying aircraft that was relatively easy to construct.

my profile on the cardboard and I used that to determine the canopy shape. Elementary engineering, but it works. If I were to do the project over, I would make it a little wider and a little longer with fixed gear."

David E. Carroll Keep it Simple

David Carroll of Kennesaw, Georgia, selected the KR-2 because of the performance-to-cost ratio: he says it is a good-flying aircraft that is relatively easy to construct. The 29-year-old programmer analyst is a first-time builder who spent 2200 hours and \$6500, not including engine and prop. He said that Rand Robinson builder

support was exceptional and that neighboring KR-2 builders Bob Muse and Jere Rosser provided the answers to all questions.

"The aircraft construction was simple and straightforward. Engine building and installation was the most difficult," said Carroll. "The airplane does not need to be wider or longer or have a fixed gear unless you plan to fly routinely at gross weight. Mechanical brakes are marginal and hydraulic brakes would definitely be preferred. I tried to keep my KR-2 as close to stock as possible but could not resist the urge to change a few things. I moved the engine and electrical equipment 5 inches forward to get the c.g. right where I wanted it without adding any additional weight. The horizontal and vertical stabilizer tips are modeled after my Dirty Bird radio-controlled pattern plane, as are the strakes. The angle of incidence on the wing was reduced

from 3.5° to 2.25° at the root and 0° at the tip for more efficient cruise. In addition, I installed a dual-stick control system.

"I have a self-built 2100-cc VW engine with a 52x52 Sterba prop and can true out 160 mph at 4000 feet MSL on 3250 rpm. Top speed is 172 mph at 3600 rpm. At 975 pounds gross weight, I have a 750-fpm rate of climb and a stall of 46 mph TAS."

Carroll's advice to other builders: "Fiberglass layups are simple and fast while premolded parts cost a lot and still require much work. Fabricate an aluminum fuel tank; any other tank will leak in time. I have a 13.5-gallon aluminum header tank with a removable panel so that the tank can be lifted straight up through the opening."

Prior to first flight, Carroll spent 30 hours of low- and high-speed taxiing because he had just 250 hours flight time and very little taildragger experi-



Richard Lind of Santa Paula, California, designed his own canopy for his KR-2.

KR BUILDERS

continued

ence. He explained, "The joke going around the airport at the time was, 'If that guy had wanted only a go-cart, he could have saved a lot of money and time.'"

Looking ahead, Carroll would like to build a composite four-seater to accommodate his growing family.

Jim Faughn **Rear Windows for Good Looks**

The most visible change in Jim Faughn's KR-2 is the rear windows that reach back to the turtledeck.

Faughn, 37, is senior vice president of Ranken Technical College in St. Louis, Missouri. He said, "I believe these windows improve the looks and, most important, improve the visibility, which translates into safety. When I'm on right downwind in the pattern, I can see the runway the entire time, which is not true without the windows. They are simple to build and I would recommend them to new builders."

Faughn selected the KR-2 because of price, performance and advertised ease of building. "All of which I found to be true," he wrote.

This project began in an attic at the college—but not as part of the curriculum. Then Faughn decided to build a laboratory in the attic and the KR-2 project moved down two flights of

stairs to an old gymnasium. Now the gym is a new library and Faughn finally built a garage at home to complete his project.

To improve the airplane's ruggedness, Faughn installed the Diehl fixed gear. "The original gear was fine as long as you kept the weight down," he explained. "However, as we add electronics, smoother paint jobs, larger pilots and more baggage, we have exceeded the capability of the stock gear. The fixed-gear decision was, I believe, one of my better ones."

This first-time builder said that his 1200-hour building time was due main-

George Toth's KR-2 has his distinctive addition: a sturdy fixed tricycle gear.



PHOTO: JIM KOEPNIK

ly to his complete lack of prior knowledge of aviation construction nomenclature and building techniques. "To size a bolt was a new experience. However, I have a very good airplane that flies great. I believe this is more because of the design than the builder."

Faughn assembled his 2180P engine in the Great Plains Aircraft Supply shop under technical supervision. "The P stands for partnership where Steve Bennett will watch over your shoulder as you build your own engine at his location. This was an excellent experience, and I am now confident that I can successfully maintain the engine."

Using an Ed Sterba 52x52 prop, Faughn's cruise is 160 mph at 3100 rpm (175 mph at 3400 rpm). Approach is at 85 mph and landing at 60. Empty weight is 625 pounds.

"The most difficult part of building the plane was always the next part," he said. "I received support from the company and most of all from the KR community of builders and pilots. They are one of the nicest groups of people I have met and a big reason I completed my airplane. There are not too many things in life that allow you to have as much fun and meet such nice people as building and flying a KR, especially the flying part."

Cost for everything, including primary avionics, was \$14,000. Faughn

A construction photo of Carrol's KR-2 shows the outer-wing fiberglass layup is nearly complete.



plans to add GPS when prices come down. "If I were to do the project again, I would buy every prefab part available," he said. "After building everything, I can see the advantages of all the premade parts. Precision prefab parts would reduce the sanding time."

Faughn talked about building a kitplane with considerable candor. "I don't intend to construct another homebuilt. My desire was to decrease the cost of flying and increase the fun. I did not enjoy the building process as many homebuilders do. Instead I endured it. I must say, though, that, in the end, the project was well worth it."

G. L. "Jerry" Robinson Continental Engine Conversion

Robinson, an insurance adjuster from Yakima, Washington, with 2200 flight hours, picked the KR-2 because it was easy to build, economical to fly and affordable. It took Robinson about 1000 hours and \$3500 to build his plane—not including engine and prop. The 46-year-old builder had previously constructed an RV-3.

Robinson made the fixed-gear conversion, changed the brakes, extended the fuselage 1.5 feet both forward and aft of the wing, modified a T-18 canopy and traded his original 75-hp Revmaster VW for a Continental C-90 engine. Anticipating the C-90, he beefed up the firewall during construction. He said there was considerably more vibration with the Continental than with the VW. Robinson recommends putting

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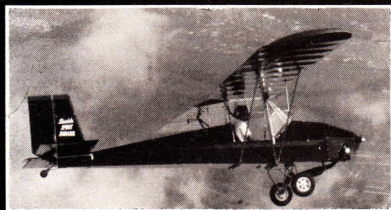
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bearings in the rudder and elevator hinges because his loosened after 880 hours of flight.

He feels that the fixed gear gave him a 300-foot shorter takeoff roll, 300 fpm more rate of climb and a gain of 3 mph in cruise. "I made one forced landing into a very short grass strip, and without the fixed gear, I couldn't have done it."

According to Robinson, the most difficult part of the construction was in turning it over to do the bottom of the wings. "I didn't want to lose any wash-out by cutting the wings and reattaching them." He cautions against making changes without first talking to someone who has successfully completed and tested them.

Robinson (no relation to Stewart Robinson, cofounder of Rand-Robin-

son) said that his KR-2 is a dream to fly. "The C-90, fixed gear and extended fuselage modifications have really made this an airplane. It has given me the power to climb out of downdrafts and get above turbulence. I've flown it to 22,500 feet and was still climbing. With the C-90, my rate of climb is 2200 fpm at 120 mph on a 70°F day. Top speed is 210 mph and a cruise is 175 at 2500 rpm with a 56/70 Sterba prop. I've landed in 70-mph winds and—with some difficulty—taken off in 40-mph crosswinds. I feel safer in this aircraft than in any other plane I have owned."

Richard Lind

The Canopy Challenge

After looking at the Loehle 5151 and Kitfox, Richard Lind bought the KR-2. The 51-year-old, 600-hour pilot felt that the kit was complete. He used prefab wingtips, front deck and cowl-ing. The aircraft, less his Revmaster 2100-D engine, cost him \$7000.

Lind used the fixed-gear package and designed his own canopy, which he



Jeanette Rand sits in Bob Muse's KR-2, experiencing the added shoulder room of his unique canopy and afterdeck.

considered the most difficult part of the project. He made a canopy mold with 12 layers of plywood, installed it on the aircraft, made the cutouts for the gullwing doors and then cut and secured the Plexiglas.

Were he to build another one, Lind says he would go for a longer and wider fuselage with more power. His KR-2 weighs 688 pounds empty with a gross weight of 1200 pounds, so he is not surprised that his performance is a bit slower than anticipated. However, when he added 0.020 aluminum aileron gap seals, he picked up 10 mph and now cruises at 145 knots. He has flown the KR-2 more than 200 hours since its completion.

On builder support, Lind said, "Jeanette Rand was always there for help. If she did not know the answer, she got it for me." His advice to potential builders: "The KR-2 is a very good flying airplane. Build it!"

Lind had no idea when he started his project how far it would eventually lead. He had been employed in the construction business, building roads and bridges, and, after finishing his KR-2, he continued his homebuilding hobby by purchasing an Express (formerly Wheeler). As this report was being prepared, Lind was in the process of moving to Redmond, Oregon, where he will be part of the team building the first two Express models.

Michael E. Ladigo Tailcone with Inspection Holes

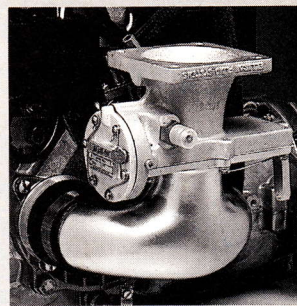
Michael Ladigo is an aircraft mechanic on McDonnell Douglas Super 80s and he listed his hobby as "aviation is it!" His reasons for choosing the KR-2 were, "cost, speed-per-hp, and the great way the aircraft looks on a low pass."

Ladigo's KR-2 took more than 3000 hours and \$4500 to build. He installed the fixed gear and Matco hydraulic

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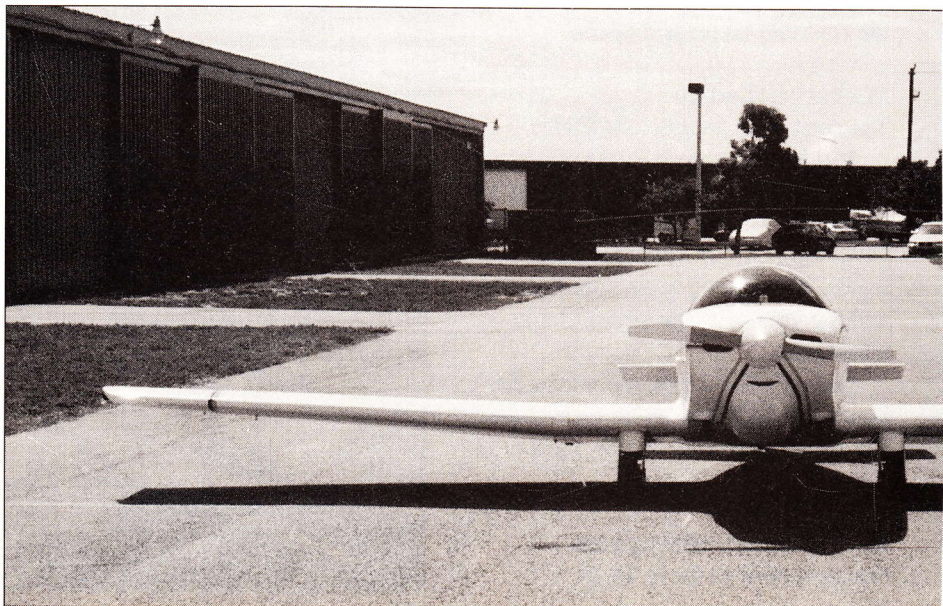
brakes. He built up the 1835-cc VW after acquiring the parts piece-by-piece. He installed Friese-type ailerons similar to those on the Cozy, but he would not recommend this modification because of the added weight and lack of a good gap seal. Ladigo also experimented with elevator balance tabs, but he is in the process of removing them because of increased drag, decreased area on the fixed stabilizer and increased elevator sensitivity. He says he will relocate the balance weight inside the fuselage to fix the problem.

Ladigo installed a larger canopy by sectioning the standard KR-2 canopy and flat-wrapping Plexiglas for the

windshield and tinted center section. He also added access holes in the tail-cone to perform maintenance on control-cable attachments.

He felt that installing the electrical system and maintaining constant cable tension while installing the control system were the most difficult items because of the lack of visual progress. "When you get to this point in the building process, I would recommend a ride in a fellow builder's finished KR for motivational purposes," he said. This probably won't be a problem, though, as Ladigo says that support from the company and from fellow builders was outstanding.

Performance for Ladigo's plane is about what he expected. "I'm using a smaller 1835-cc engine, so my KR-2 is a bit slower, but performance is still stupendous," he said. "Roll is light and quick, and pitch is light and sensitive, although overly so when loaded heavy.



Jim Faughn designed and installed rear windows in his KR-2. He says he did it for good looks and safety.

Top speed is 160 mph with cruise at 130 mph on 3250 rpm with a 52x48 Sterba prop."

Ladigo must be well satisfied with his KR-2 because he is now building a KR-1 1/2. "The concept is not new but this particular aircraft will be all mine. I'm using a stretched KR-2 fuselage narrowed to single-seat, a slightly modified KR-1 wing and Rand's latest firewall modification for the KR-2S so that I can use engines larger than the VW conversion."

Ladigo volunteered his address and phone number for anyone with KR questions: 6822 South Toledo No. 421, Tulsa, OK 74136; call 918/495-3662.

Steve Makish Improved Plans

Among the earlier KR builders we surveyed is Steve Makish of Baton Rouge, Louisiana. He is a 51-year-old electrical contractor who met Ken Rand at Sun 'n Fun in 1975 when the Wicks KR was on display. Makish was familiar with wood and glass and

Steve Makish was an early builder who says that plans have greatly improved since the first iterations. Makish stuck to them as can be seen by the stock and stubby retractable gear.



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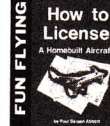
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KR BUILDERS

continued

began building his KR the same year. It took 1800 hours and \$9000 for this first-time builder to complete his KR-2 airframe. Prefab parts included the cowl, turtledeck and Diehl wing skins. "The original plans were referred to as *suggestions* and you had to read between the lines. The new plans are great!" Makish noted.

Makish literally fell into an engine when a Porsche toppled off a grease rack. The builder purchased the Type IV 2600-cc engine as salvage. Even though his KR-2 is heavy—720 pounds empty—he gets 160-165 mph. Rate of climb is 1200 fpm solo and 800 fpm at gross. He says stalls occur at 60 mph and are very gentle. "It does not drop a wing or snap over," he says.

Were he to do the project again, Makish would get all the prefab parts available. Then he would use fixed gear and lengthen and widen the fuselage. Like the other KR builders, Makish noted that builder support was excellent. "Jeanette is both actively and personally involved with the KR pilots and builders," he said.

Makish has 700 hours of flight time and has already started a Glasair TD. "I need it for speed!" he said.

George Toth Tri-gear KR

Toth is yet another builder who isn't afraid to make basic changes in his KR-2. A mechanical engineer with 4600 hours and ATP and CFII ratings, Toth took 1700 hours and about \$8500 to complete the project. His reasons for wanting a KR were cost, construction, shape, speed and economy.

He used prefab components for the engine cowl, turtledeck, canopy frame, forward deck and Dan Diehl wing skins that extend the span by 24 inches, but he did not install flaps. He increased the size of the tail feathers, both horizontally and vertically. He chose Cessna avionics so that he can swap black boxes with his Cessna 150.

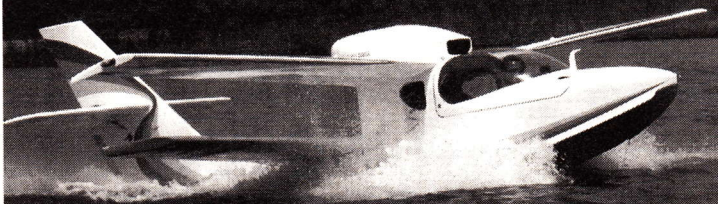
Toth's KR-2 first flew as a taildragger equipped with Matco hydraulic

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Mike Ladigo installed a larger canopy on his plane by sectioning the standard KR-2 canopy and flat-wrapping Plexiglas for the windshield and tinted center section.

brakes. "The brakes kept locking up because the piston rod rubber plug that covers the bypass center hole on the piston was reacting with the brake fluid and it swelled," Toth explained. "Two years ago, I skidded off the runway with a locked brake and broke off both gear legs. At that time, I decided to redesign and rebuild the plane with tricycle gear. It took me a couple of months to do the design work. I installed aluminum plates between the two spars so I have only bending forces. My main gear legs are made with 40 layers of unidirectional glass tapes compressed to a 1-inch thickness. The nose strut is made of 4130 aircraft quality tubing cold bent and filled with epoxy soaked in unidirectional fiberglass. Through two sleeves, it is bolted to the firewall where no additional strength is required. Weight increase was 12 pounds and the speed change was negligible. The new gear is so streamlined that the airplane doesn't want to slow down on landing, so I designed and installed a belly speed brake. There was not enough drag without flaps."

Toth drilled $\frac{3}{16}$ -inch holes in the spar for his landing gear attachments, so while the modification was being done and the airframe was upside-down, the engineer loaded the wings with 4400 pounds of sandbags giving a stress of 4.9 gs. The load was undisturbed for 1.5 hours and the wingtips

drooped 4.5 inches. After removing the weight, Toth reported that the wings returned to the original position without any permanent deformation.

His KR-2 is powered with a normally aspirated, 75-hp Revmaster 2100D with dual Bendix ignition, Super Posa carb with mixture control driving a 52x49 M.T. Perry multi-laminated propeller. With an empty weight of 637 pounds, Toth has a true airspeed of 170 mph at 10,000 feet on 3.5 gph. He has installed a 17-gallon aluminum header tank that provides 3.5-4 hours of duration.

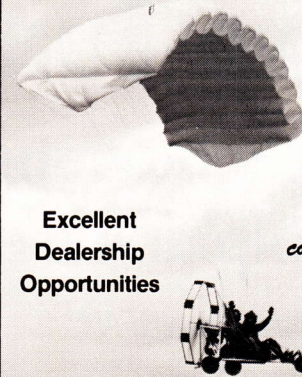
Toth's KR-2 was his first building project. Now he plans to build a Carbon Dragon sailplane and another powered plane of his own design. He says he will supply drawings of his trigear installation to other KR builders. For information, write him at 920 Lawrence St. No. 304, Tomball, TX 77375.

Summing Up

It took us two issues, but we finally completed the KR Builders' Survey. The enthusiasm these builders have for their airplanes is unsurpassed if not unequalled. There is no doubt that KR fever has generated a wide variety of interesting builder stories, and we found one thing for sure: KR planes are as unique as the builders who construct them. □

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