Spoiler Alert! - The Taylorcraft L-2M

By: Matthew McDaniel

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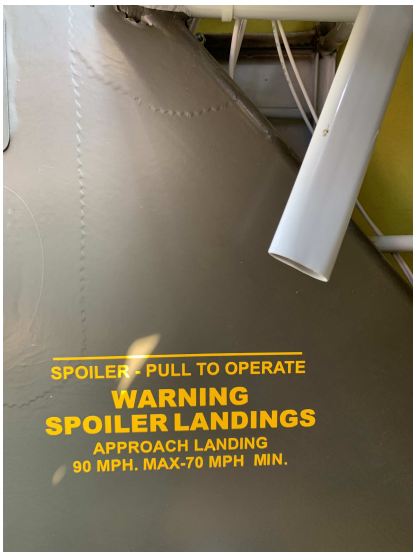
After departing sleepy Martin Field on the outskirts of Walla Walla, WA, we climbed in the calm morning air. Ascending at a steady 500 feet per minute (FPM), I leveled off at 3,500' feet. The placard by my left knee warned that spoiler landings should be conducted at approach speeds between 70 and 90 MPH. So, after stabilizing at 70, I set the elevator trim to match. Then, I pulled the power to idle and held 70, allowing the descent rate to settled in at a sedate 500 FPM. Reaching above my left knee (just above the aforementioned placard), I grasped the small gray handle and did exactly as the placard instructed. I "pulled to operate." A slight rumble resonated through the airframe as the 3 spoiler panels extended above each wing at mid-span. I pitched over slightly to maintain that same 70 MPH and the descent rate immediately doubled, stabilizing at 1,000 FPM. Finally, I pushed the right rudder to its forward stop and matched that with enough left aileron for a maximum effort forward slip. That added another 400 FPM to the descent rate and we sank earthward at 1,400 FPM. The circular farm fields and their center-pivot irrigation systems began to rapidly increase in size.

The L-2M wing spoiler system consists of three spoiler panels at mid-span on each wing and a spring-loaded extension handle under the left side of the instrument panel. The placard is required to be in place for the spoilers to be operational.



Taylor-Made

Brothers Clarence ("C.G.") and Gordon Taylor founded Taylor Bros. Aircraft Manufacturing Co. in 1927 in Rochester, NY. Their first aircraft model offered for sale, the 2-seat, high-wing "Chummy," was a commercial flop. Less than a year later, while demonstrating the Chummy, Gordon was killed. C.G. persevered and developed the improved B-1 model Chummy before moving to start anew as Taylor Bros. Aircraft Co., in Bradford, PA. That venture ended in voluntary bankruptcy, with the assets being purchased by William T. Piper (who'd been involved only tangentially prior to that). Piper kept Taylor on, giving him a 50% stake in the new Taylor Aircraft Co. In 1931, the Taylor E-2 Cub was introduced, designed by Taylor to meet Piper's desire for an affordable and easy to fly trainer to sell to flight schools. In spite of steady sales, Taylor and Piper parted ways in 1935, with Piper buying out Taylor's share of the company and renaming it Piper Aircraft Corp. (and retaining the rights to the Cub design). Taylor started his own company, with an eye on creating a design better than the Cub. In 1936, Taylor debuted the Taylorcraft Model A with side-by-side seating, dual controls, and a Continental A-40 engine. Soon after, he moved his new company to Alliance, OH, where over 1,800 Model A's would be built. The company name evolved through several variations before becoming the Taylorcraft Aviation Corp. in 1939.

The Taylorcraft "Chummy." A commercial flop, but the genesis of the Taylorcraft line of aircraft.

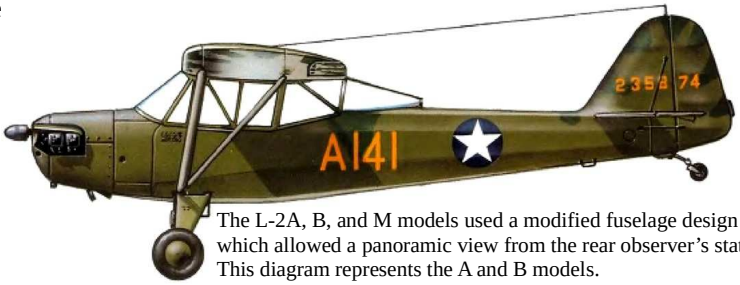
The side-by-side seating arrangement of the pre-WWII A and B models are what most pilots picture today, when thinking of a Taylorcraft (versus the tandem seating of the Cub designs). But, Taylorcraft re-introduced tandem seating with their D model, starting with the DC-65 in 1941. This new design and its seating arrangement targeted military preferences and the Civilian Pilot Training (CPT) program. The D models were available with Continental, Franklin, or Lycoming engine options, all offering 65hp.

Enlisted or Drafted

In the Summer of 1941, Taylorcraft loaned four Model B's (and demo pilots) to the U.S. Army Air Corp. (USAAC) for evaluation. Along with two other civilian types (from Aeronca and Piper) evaluated at the time, the Taylorcrafts helped prove that light civilian aircraft could play a legitimate military role. That autumn, while the Model D (DC-65) was still completing its certification process, four examples were sold to the USAAC, equipped with Continental YO-170-3 engines. These aircraft were designated YO-57, and were relatively successful in their military trials. In Nov. 1941, in perhaps coincidental timing (perhaps not), both the civilian DC-65 achieved full certification and the USAAC placed an order for 342 O-57s. The production O-57 was nearly identical to the civilian Model D, with the glazed overhead panel between the wings of the O-57 being the only obvious difference. However, the O-57 was soon modified further by lowering the fuselage behind the aft seat to allow a panoramic cockpit window arrangement. The rear cockpit area was converted to an observers station with a rotating seat and an aft-facing work table. This model was designated the O-57A. These military models were re-designated L-2 and L-2A, respectively, in June, 1942, when the "Observation" designation gave way to the "Liaison" label. In total, nearly 550 of these earliest models were built for the military (only 70 of which were the original O-57/L-2 version).


One of four Taylorcraft Model Ds sold to the USAAC, who designated them YO-57, in the autumn of 1941. The production O-57 was later re-designated L-2. Note this pre-production model lacked the full glazed fuselage roof panel between the wings. The O-57/L-2 retained the same tall fuselage of the civilian Model D, while the fuselage was lowered behind the wing in the subsequent O-57A/L-2A models.

The L-2B was a dedicated artillery spotter and carried role-specific equipment to facilitate that mission. Four hundred and ninety (490) of the B-models were built for the U.S. Army Field Artillery. The L-2C through L-2L designations represent a confusing array of civilian Taylorcraft models that were drafted into military service during the war. These included both Taylorcraft B and D models, with various engines installed, each with less than 10 examples purchased from civilian owner/operators and some represented by a single example only.



The L-2A, B, and M models used a modified fuselage design which allowed a panoramic view from the rear observer's station. This diagram represents the A and B models.

Taylorcraft also used it's L-2 model as a basis for the ST.100 training glider, which had an L-2 fuselage with an enlarged vertical stabilizer. Removal of the engine allowed the nose to be extended well forward of the wing, accommodating a 3-seat-in-tandem arrangement, enclosed by a bulbous array of glazed panels. The instructor sat in back, with a beginner student in the middle and an intermediate student up front. The landing gear was simplified to reduce weight, drag, and maintenance, and spoiler panels were added to the wings for speed and lift control. The ST.100 was intended as an inexpensive solution to help meet the Army's need to train combat glider pilots. Designated the TG-6 by the military, 253 were built (including prototypes), starting in 1942.

The TG-6 was a 3-seat training glider that developed out of the Taylorcraft L-2. It would also be the first L-2 derivative to utilize wing spoilers. This restored and flyable example is pictured on display at EAA AirVenture in Oshkosh, WI in 2018.

The final, and most-produced, version of the L-2 was the M-model, with 900 built (mostly in 1943). The L-2M had several improvements over its immediate predecessor, the L-2B. Most notable was the fully enclosed cowling, a revised instrument panel, and the addition of wing spoilers. The spoiler addition was likely to streamline production. TG-6 wings were identical to the L-2B wings, except for the addition of spoilers. With the B-model production ending, the TG-6 wings could become interchangeable with the L-2M wings if both included spoilers. This also enhanced the L-2's short field landing capabilities and overall versatility for dropping into confined landing zones. Notes on proper spoiler operation were added to the Army's "Pilot's Flight Operating Instructions" manual, specific to the M-model.

This grainy war-time image of an L-2M can be distinguished from previous L-2 models by its fully enclosed cowling (introduced on the M-model).

The L-2's enlistment term was relatively short. The last order for L-2s was placed in Jan. 1943. By the middle of that year, the Army Field Artillery was becoming concerned about the L-2. They had proven to have a higher than average fatal accident fate, mainly attributed to stall/spin accidents. They tended to enter a stall/spin with less warning than the Piper L-4 (Cub) and to spin faster, as well. Considering the aggressive maneuvering at low altitude required by the artillery spotter role, that was a problem the Army brass couldn't ignore. As a result, all L-2s at Ft. Sill were grounded in July, 1943 and many were soon transferred into glider pilot training programs. The L-2M made an excellent platform for teaching glider landing techniques. Not only was it self-launching (no tow plane required), but at idle it had similar glide characteristics to the large combat gliders and it had spoilers to boot. Yet, even the need for that role was all but eliminated after the D-Day invasions in June, 1944. Other L-2's were transferred into less demanding duties, or given to foreign governments under the Lend-Lease program. By the end of 1943, L-2s had already been declared "limited standard" with the Army preferring the Piper L-4 for artillery spotting. Sadly, before the last L-2M was even delivered, those with no alternative role to be moved into were already being parked. The last 26 L-2M's were delivered in March of 1944, fulfilling Taylorcraft's contractual obligation and ending L-2 production at just shy of 2,000 aircraft (plus the 253 TG-6's).

Post-War L-2's

Like so many other aircraft companies, Taylorcraft produced more aircraft immediately after the war than they could sell and were forced into bankruptcy. They would, however, return multiple times over the decades, under various iterations of the Taylorcraft name, to certify and manufacture both existing and new models.

Adding to Taylorcraft's new aircraft sale woes, surplus L-2 and TG-6 models were plentiful after the war. However, the majority were in various states of disrepair and were sold as non-airworthy. After the type had been somewhat unfairly saddled with a "dangerous" label in the artillery spotter role, its fate was sealed. Hundreds of L-2's saw little to no use in the closing years of WWII and were parked in the elements (deemed unworthy of limited covered storage). Given the cotton fabrics of the time, and their far from moisture-tight construction, most were in tatters by war's end. However, that may very well be why so many survived to be converted into civilian life. They were cheap to buy surplus, relatively simple and inexpensive to repair, and both easy and fun to fly.

Civilian L-2's were popular enough that even TG-6 gliders were being converted back into powered L-2's via approved modifications. One would think that would be more trouble than it was worth in order to end up with an L-2. However, the low value of a surplus TG-6 likely made even L-2's created by such means a bargain. Many L-2A's, B's, and M's were converted back to L-2 (BC-65) configuration by removing the wrap-around greenhouse enclosures and raising the aft fuselage back to the original design. This better sealed the cockpit making the aircraft a bit more useful for year round operations and increased interior space for baggage or cargo. In spite of all these approved modifications to "civilianize" L-2's and TG-6's, there were initially two areas in which the Civil Aviation Authority (predecessor to the FAA) seemed to have no tolerance. The first involved the spoilers of the TG-6/L-2M wings. If those wings ended up on any powered L-2 model, the spoilers were required to be either removed or permanently secured in the closed (down) position. This decree resulted from a note in the Army's L-2 operations manual, which reminded pilots to never touch down with the spoilers deployed. It stated, "...the excessive rate of descent may overstress the airplane upon hard contact." Thus, the first generation of civilian L-2's and even those restored for the early years of the warbird movement were prohibited from retaining (or utilizing) their wing spoilers.

In the more recent generation of warbird restorations (when various observation/liasion models became far more popular), the spoiler question was revisited by owner/operators and the FAA alike. It is said that one owner, trying to make a point, even took off with the spoilers fully deployed to prove it could be done. Today, L-2M's can be configured with fully functional spoilers, as long as the appropriate placards are in place and those limitations are respected (including the prohibition against landing with them deployed).

The second item the CAA flagged for civilian L-2's has carried over into the FAA-era. Starting with L-2A's the rear seat could be rotated 180-degrees in flight, in order for the observer to utilize the rear-facing work desk and the panoramic view to carry out their duties. Even today, this is not permitted in civilian L-2's. The rear seat must be bolted into position before takeoff and stay in that position during flight. Only if the rear control stick is removed can that position be rearward facing.

Typical of most aircraft in this category of WWII Grasshoppers, all models of the L-2 have become popular restoration projects and sport planes. Their economic operations, relatively simple construction and maintainability, and overall docile flight characteristics, make them both truly attainable warbirds and affable sport aircraft.

“I’m Looking for a Project...”

L-2M Serial #L-5302 was manufactured in July 1943 and assigned USAAF Serial #43-25990. While its full military and early civilian history has largely been lost to time, some interesting facts are known. It was stationed at South Plains Army Airfield near Lubbock, TX in Sept, 1943. The 64th Two-Engine Flying Training Group was training both tow pilots and glider pilots at the time. In L-2’s, this likely consisted mainly of dead-stick gliding and landing practice, before pilots were transitioned into pure gliders (all already had initial training in powered aircraft). Trainee Carl W. Tschantz apparently had a taxiing accident in 43-25990. The accident was coded a 3 (out of 5) in severity, meaning it likely involved a prop-strike and wing and/or engine damage. This obviously did not wash Mr. Tschantz out of the program though, as he eventually became a combat glider pilot with the 101st Airborne Division. Nor did it end L-5302’s flying; it flies on today as N9045S.

Don Bais and his 1943 Taylorcraft L-2M, on the ground and airborne at their home airport, Martin Field (S95) in College Park, WA.

Don Bais became aware of 43-25990 in the mid-1990’s, while living in California. He’d grown up in Saskatoon, Saskatchewan, Canada, gazing skyward as planes passed over and building cheap model aircraft. In 1956, he got his first plane ride in a brand new Cessna 170 and was immediately hooked. By 1958, he’d earned his Canadian Private Pilot License and was flying Tri-Pacers and Fleet Canucks in a flying club. Soon, marriage and children took priority and Don shelved his flying activities until 1972. It was then, while attending graduate school in Walla Walla, WA, that he bought his first plane (an Ercoupe). By 1977, he’s moved up to a Beech Musketeer and was living in San Jose, CA. He purchased a Piper Comanche 260B in 1983, which he still owns and flies today (after 42+ years of ownership).

It was the Comanche, that lead to the L-2. While having the annual completed in Santa Rosa, Don casually mentioned to the mechanic that he was looking for a project plane. The mechanic told him of a long-dormant L-2 project and put him in contact with the owner. After much research, Don purchased the derelict L-2M in 1997. Thanks to the demands of full time employment, the restoration effort dragged on for nearly 7 years. During those years, Don was able to track down new old-stock wing spoilers, plywood leading edges, and all the plexiglass from the windshield to the aft observer’s bubble. His only real concessions in the restorations were to safety. He wanted an electrical system to eliminate the need for hand propping and to allow for exterior lighting, a radio, intercom, and transponder. While that necessitated upgrading the engine to a Continental C-85-12, the extra 20hp (85 versus the original 65) is welcome during all phases of flight. Finally, when it came time to paint over all his beautiful Polyfiber fabric work, Don wanted it to look as original as he could make it. No false invasion stripes, no glossy finish, no over-the-top nose art. Randolph Products Co., had produced the original Olive Drab and Neutral Gray dope and paint. Don learned they still existed and would make up what he needed to apply historically accurate paint to his L-2M. He wrapped up the restoration in May, 2004. But, L-5302’s return to flight status was further delayed by a move back to Walla Walla and FAA paperwork.

Prior to Mr. Bais buying the L-2 project, the last registered owner was in Galt, CA, 33 years prior. From that owner, the plane had been sold and moved to Sacramento. That owner stripped the rotting fabric and removed the wings during his 6 year ownership, but never registered the plane. The next owner took the plane completely apart and stored it for 27 years.

Add Don's 7 year restoration, and his little L-2M hadn't held a valid registration in four decades and the previous 3 sales had never been reported to the FAA. However, after jumping through the necessary hoops, Don finally got it successfully re-registered in Sept. 2004 and it flew shortly thereafter, after over 40 years of dormancy.

(Left) The rear observer's station of Bais' L-2M, with the seat in the aft-facing position. Note the large work table, foot-wells, and wooden chart holder. The panel is basic with throttle and trim controls on the left, spoiler handle (lower left, below panel), and heel-brakes. The small battery supports the electrical system for engine starting and powering the modern radio and intercom. (Center) The wingtip grab handles are just one of the many details that Bais took the time to do perfectly during his full restoration. (Top Right) The termination of the rear-inboard wings had to be completely re-designed when the greenhouse canopy (introduced on the A-model) necessitated the removal of the upper fuselage that the wings attached to. (Bottom Right) While Bais used the original paint colors on this L-2M, a slight variation of olive drab green can be seen between the fabric areas and the metal cowl and boot-cowl. This is as it would have been originally, with the same paint drying to a slightly different shade based on the color and material it covers.

Grasshopping

The flying manners of the L-2 may not have been ideal for the low-altitude yanking and banking required for artillery spotting (and evading), and it may have under-performed when carrying excessive military hardware. However, for typical civilian use, the L-2's flight characteristics are both pleasing and predictable. With full fuel of 14 gallons on board (6 per wing tank and 2 in the fuselage header tank), we were still a bit shy of Max. Gross Weight (thanks to two below-average size pilots, coming in at least a couple stones below the USAAF's placarded max. crew weight of 340 lbs.). The temps were well above standard in southeastern Washington's summer heat, however. We did have one advantage; the extra 20hp from the Continental C-85. With that formula, we could easily climb at 500 FPM at 60mph IAS. N9045S seemed to cruise happily at 95-100 IAS at moderate cruise power settings. Steep turns were easy to fly with the aircraft displaying no serious tendency to over-bank and with the aileron forces being only slightly heavier than elevator or rudder. Slow flight and stalls were very predictable. Don built up a straight and well-rigged L-2M, which displayed no tendency whatsoever to drop a

wing when entering a stall. Otherwise, what airwork is there really to do in an L-2? We went through the spoiler exercise detailed in the opening paragraph and, without parachutes, spins were not an option. So, to the pattern…

L-2M 43-25990, with its 85hp upgrade is a delight during pattern work. With the extra ponies, it climbs to pattern altitude and is stable there by mid-field downwind. Abeam the numbers, retarding the throttle to 1000 RPM set up a tranquil descent rate. Too tranquil for the tight patterns I prefer to fly, in fact. But, that also presented the opportunity to practice dissipating altitude quickly. With power pulled to idle, you can very effectively slip the L-2 like any other flapless Cub or Champ category aircraft. Yet, in the L-2M you have other options. Deploying the spoilers is even more effective than a standard slip, without the need to cross-control. Only a slight change in pitch is necessary to stay above the minimum spoiler deployment speed. In a matter of a few seconds, you are back on glidepath and ready to retract the spoilers for touchdown. Since the spoilers are spring loaded to the down (closed) position, simply releasing the handle quickly stows them.

The L-2 can be wheel or 3-point landed with equal aplomb. However, for the shortest landing distances, utilize a 3-point touchdown at minimum speed. After touchdown, with the throttle safely closed, the left hand is free to deploy the spoilers to quickly kill lift, increasing both down-force and brake effectiveness. With that technique and a little practice, the L-2M can be easily stopped within just a few hundred feet with even just a light headwind advantage.

Flying the L-2, it feels like it was perhaps unfairly stigmatized in its WWII service life by being asked to do more than it was designed to do and/or had the horsepower to pull off. However, today it is an honest flying sport aircraft that would likely remain very well mannered when flown within its normal operating parameters. Plus, it is a true warbird worthy of both preservation and appreciation for what it is; historic, unique, and just plain fun to fly.

The author (left) and owner/restorer, Don Bais (right) enjoy a flight in Bais' L-2M. After a 7 year restoration effort, Bais has been enjoying flying his L-2 for over 20 years now.

About The Author: Matthew McDaniel is a Master & Gold Seal CFII, ATP, MEI, AGI, & IGI and Platinum CSIP. In 36 years of flying, he has logged nearly 23,000 hours total and over 6,100 hours of instruction-given. As owner of Progressive Aviation Services, LLC (www.progaviation.com), he has

specialized in Technically Advanced Aircraft and Glass Cockpit instruction since 2001, yet retains a passion for teaching in and learning about antique taildraggers. Currently, he's is also a Boeing 737-series Captain for an international airline, holds 8 turbine aircraft type ratings, and has flown over 155 aircraft types. Matt is one of less than 10 instructors in the world to have earned the Master CFI designation for 12 consecutive two-year terms. He can be reached at: matt@progaviation.com or 414-339-4990.