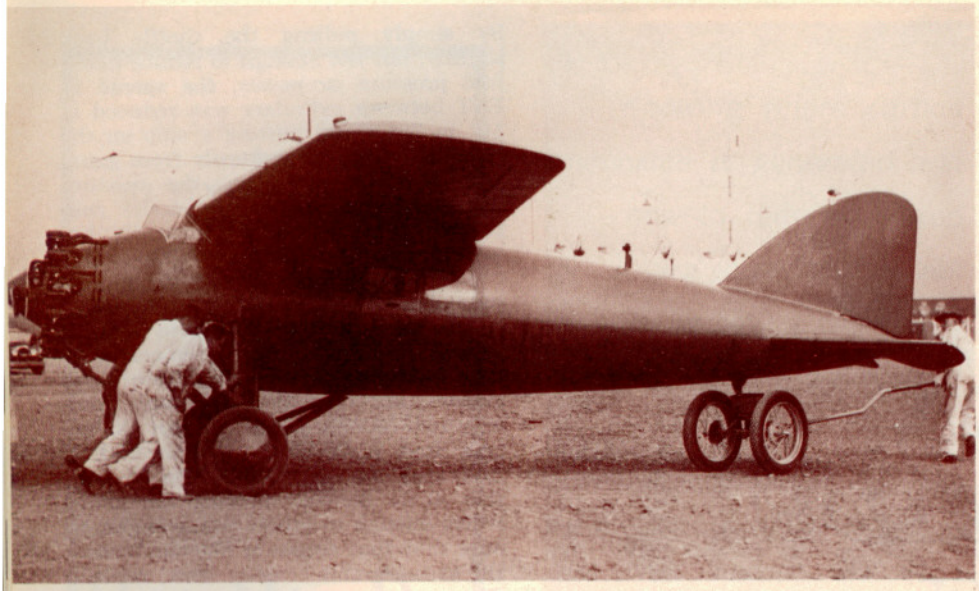


It took four men to get the steel-tube dig-in tail skid of this prototype Lockheed Vega Golden Eagle up on the dolly. The long handle on the dolly was used for steering. This plane was entered in the 1927 Dole Race, which was run from Oakland, Calif., to Honolulu.

Yesterday's Wings:

The Tail Skid

Few skid-equipped airplanes operate in the United States today. Those in existence are rare antiques

by PETER M. BOWERS / AOPA 54408

■■ One of the forgotten features of yesterday's airplane is the tail skid. Progress in airplane design and airport layout began to kill off this distinctive item in the late 1920's, and some very interesting airplane-operating techniques went into limbo with it. Although still to be found in respectable numbers in some other countries, there are very few skid-equipped planes operating in the United States today. Skids are completely unacceptable on current general aviation airplanes and are prohibited on most airports. The surviving skid-equipped models are mostly antiques of the 1920's or earlier that have been restored "pure" for operation from private grass strips and appearances at occasional air shows.

The tail skid, combined with brakeless wheels fitted with high-pressure tires, was standard equipment for all pre- and post-World War I airplanes until the end of the 1920's. The skid, generally made of ash wood and fitted with a steel shoe, served a dual purpose. It acted as a brake to shorten the landing roll, and its drag made a major contribution to directional stability during the landing roll and when the plane was taxiing. Since they were intended to dig into the ground, most skids were mounted at a steep angle relative to the fuselage. These old wood or steel tube skids stuck up quite far into the fuselage, the upper ends being secured with springs or rubber shock cord to absorb shock and permit a degree of flexibility. The dig-in characteristic was abetted by the extreme forward location of the wheels in the older designs. This put plenty of weight on the skid, adding to braking effectiveness but considerably increasing the manpower requirements for ground handling.

Extensive taxiing wasn't a part of old-time airport operations, so the effect of having the brake on all the time wasn't too great a handicap except when trying to get a heavily loaded plane moving. There was no long haul down to the end of a paved runway prior to takeoff. Most airports were turf, with the hangar generally centered at one side. The planes merely taxied straight out from the hangar a short distance, turned into the wind, and took off. The pilots also set up their landings so that they stopped just short of their parking spaces and had only to turn and taxi a short way in.

Getting the plane turned downwind toward the hangar at the end of the landing roll was sometimes quite a problem, especially with no brakes, since

Wing-tip helpers walk a World War I "restored-pure" Avro 504K. It was necessary for helpers to maneuver this tail-skid, no-brakes antique safely across paved runway in a crosswind.

few of the old designs had steerable skids. If needed, the line boys, mechanics, or other pilots would run out and steer the plane to the hangar by holding the wing tips.

If there was room, the pilot could blast a tail-skid plane into a sharp downwind or crosswind turn by some fast and tricky cockpit work. The technique was to push the stick forward, apply full throttle briefly, and kick hard rudder. As soon as the skid was off the ground and the turn started, stopping action was initiated by chopping the power, pulling the stick full back, and kicking hard-opposite rudder. The torsional loads this procedure put into the wire-braced wooden fuselages of the World War I and early 1920's models hastened the end of their relatively short operational lives.

Making a tight turn while rolling, so as to avoid hitting something ahead, was an exercise in sheer willpower by modern standards. With no brakes or steering, the only way to avoid a collision was to apply full throttle while headed straight at the obstacle in order to get the skid off the ground and enough slipstream on the rudder to make a turn possible.

The high percentage of airplane weight on the tail skid as compared to latter-day tail wheels made the airplanes of the 1920's difficult to move into and out of the hangar and around the ramp. This was resolved by lifting the tail of the plane off the ground by manpower and resting the skid on a special two-wheel dolly. A departed fringe benefit of this procedure was that there never seemed to be enough professional manpower around when needed, so there was plenty of opportunity for interested teenagers to make themselves useful around the airport by helping to lift tails. Some of the airliners and heavy military types had special fittings aft of the skid that engaged the dollies and eliminated the need to lift the tail high enough to get the skid itself on the dolly.

Several things combined to start the tail skid on its way out. The development of recognized runways and the need for longer takeoff runs for planes with higher wing loadings ended the midfield takeoff technique and meant longer taxi runs that encouraged the use of tail wheels. Airline passenger displeasure with the disconcerting blast-and-turn technique hastened the adoption of the tail wheel on airliners, the first class of civil aircraft to use them extensively. The cost and weight of steerable tail-wheel units kept skids in use on lightplanes for many more years, some managing to survive almost until World War II.

Another new airport feature that hastened the demise of the skid was the use of pavement. Unable to dig in on such a hard surface, the skid lost most of its effectiveness. The loss of skid braking was largely offset at this time by the introduction of wheel brakes on the military and larger commercial planes and by the big soft airwheels that the lightplanes adopted in 1929.

With its braking function gone, the tail skid took on another form. The old near-vertical wood and steel tube skids were replaced by bent steel leaf springs set at a considerably flatter angle. These were tipped with replaceable shoes, some of which were quite wide and therefore called "spades" because of their shape.

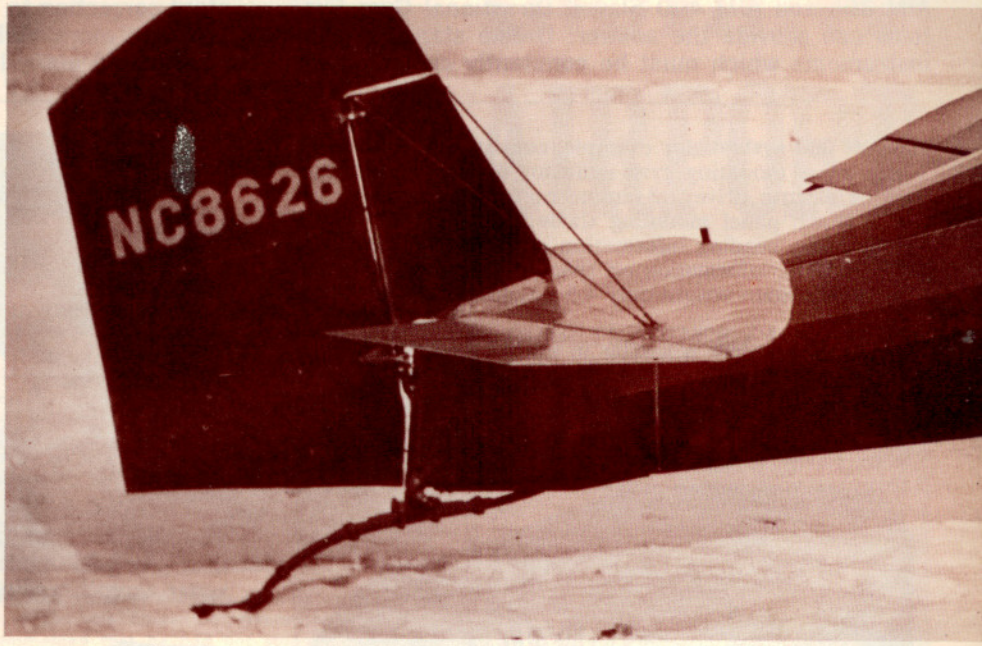
Steel leaf skids on pavement greatly complicated the steering problem for the no-brakes airplanes. Even on hard dirt a spade would slip over the surface instead of digging in. Since these skids could slide sideways as easily as they could forward, any small deviation from a straight landing roll that was not caught immediately became a ground loop almost inevitably. Turning a lightplane with a leaf skid downwind or crosswind on a windy day and then keeping it on the desired heading was well-nigh impossible. On a hard surface a moving lightweight like the Aeronca C-3 would weathervane right back into the wind. Before surrendering to progress and adopting a steerable tail wheel for his 1931 C-3 after he bought it in 1951, the author was caught in the crosswind trap several times. He'd be spinning around in circles at the runway intersection trying to get headed toward the hangar while everyone there thought that he was playing games. No one remembered that walking wing tips to help the lightplanes taxi in had been a regular part of an airport job just a few years before.

Actually, the prohibition on tail skids at modern airports is more a safety measure than a precaution against digging up the turf or scratching the pavement. Even when it has brakes, a leaf-skid plane taxiing on a paved ramp can be swerved by a gust, and the pilot will be helpless to keep it from hitting nearby planes. Rules can be waived, however, and tail-skid planes do come into the regular airports occasionally, usually with advance permission as obtained by nonradio types who come into a tower-controlled field. Even then, they shun the paved runway and land on the turf. Some of the antiques, which used to have skids but are fitted with tail wheels, also prefer the turf to the pavement. This is because the far-forward location of their main wheels and the loss of tail-skid drag makes them notorious groundloopers.

When the braking function was transferred to the front wheels, there was no longer a need for so much weight on the tail, and the main wheels were moved aft a bit on the newer designs. This lighter load made tail-wheel steering easier, but more important, the relocated main wheels greatly reduced the groundlooping tendency inherent in the far-forward location.

The authentic World War I vintage exhibition types confine their major airport appearances to air shows and occasions when the field is closed to regular traffic for their special benefit. Then they operate from the turf or specially bulldozed dirt strips alongside the runway. In the absence of tail-skid dollies as standard airport equipment, their tails are hoisted to the tail gate of a pickup truck for the haul from the hangar or ramp to the takeoff area.

France and England, where there are still turf fields and a goodly number of pre-World War II trainers and lightplanes in the clubs, are the last notable strongholds of the tail-skid airplanes. Except for the examples mentioned, they have vanished from the American scene. The next time you hear an old pilot bragging about how much better things were in the good old days, you can be sure that he isn't including the tail skid as one of the brighter features of the era. □



The major disadvantage of the leaf-spring tail skid, as shown with shoe on this 1929 Fleet 1, was that the skid could slide sideways as easily as it could slide forward.

Photos by the author