



US Forest Service Photo
LODD in Single Engine Air Tanker

Aviation has been a part of wildland firefighting since just after World War I. Initially the aircraft role was limited to spotter missions. In those days planes were not equipped with radios so communicating with ground crews consisted of landing to talk or dropping a message scrawled on paper and placed in a container that would withstand the drop. In the 1920's the entire squadron of planes assigned to wildfire duty in California were sometimes grounded for weeks at a time due to a shortage of high quality gasoline. Early attempts at aerial application of water and retardants began with dumping water from wooden beer kegs from the back seat and using a garden hose attached to an on-board tank to spray the fire.

After World War II the availability of surplus bombers and transport aircraft to carry large quantities of water and retardant gave firefighting efforts a huge boost. Beginning in 1953, B-25s, B-17s, C-47s, DC 4s, TBM torpedo bombers, Consolidated PBYs and other aircraft were able to carry 600 gallons or more and their low stall speeds, toughness and maneuverability made them excellent tools for a new type of combat. At the same time

some single engine tankers were developed using Stearman and N3N pilot training biplanes converted for fire suppression as well as pesticide application. The bigger tankers became the tool of choice and eventually single engine tankers were practically phased out.

C-47s, Twin Beech, C-82s and L18 Lodestars, among others, were used for smoke jumping. On August 5, 1949 a C-47 carried 16 young men to remote Mann Gulch, Montana. 13 of them died there after being safely dropped onto a fire that blew up and burned over them. Famed writer Norman Maclean wrote an excellent account of the event called "Young Men and Fire". It is perhaps the best exploration ever written of the physical, organizational, cultural and psychological causes of firefighter LODDs. His perspective after years of research comes down to this passage: it is the story of men "still so young they hadn't learned to count the odds and sense they might owe the universe a tragedy".

By the 1960's helicopters were being used to ferry crews and equipment, performing rescues and for bucket drops of water. Although helicopters could not carry as much water as the big tankers they had the advantage of almost pinpoint accuracy and better ability to maneuver in canyons and other difficult terrain.

In 2002 two crashes of the big old tankers resulted from the wings literally breaking off as they made their drop runs. The Federal Aviation Administration and Forest Service grounded all of them while extensive airframe checks were conducted. The inspections brought bad news, many of the planes showed cracks and other signs of impending failure. The problems were compounded by the lack of records from their service as military aircraft, This made it hard to determine what severe conditions they had been subjected to and that service would affect their longevity.

Although many of the craft eventually were cleared for duty and newer planes entered the service, suddenly the sidelined Single Engine Air Tankers (SEATs) became a much more attractive and important alternative plus they were less expensive to use than helicopters.

Fire agencies scrambled to try to make up the resource deficit left by the big tanker grounding. One of the most popular SEATs is the Polish M-18A Dromader. The tough little planes are used worldwide for fire and crop dusting applications.

Wayne Turner had over 21,000 hours and 40 years of flying experience, mostly crop dusting when he made the transition to firefighting. He had 35 hrs in the Dromader owned by New Frontier Aviation out of Montana. On June 17, 2004, he was making retardant drops for the BLM about 14 miles north of St. George. The Dammeron Fire was started the night before by lightning that ignited two areas. These small fires later merged and worried the nearby residents. Just up the road, a third fire threatened Brookside and caused more than 20 homes to be evacuated.

Turner had made at least 4 drops on the fire over two days when he made his final flight. He came in for a dry run to check conditions and to get properly oriented. On the second run he overshot the final approach and went around for a third. As he came in at about 100 ft up, something went wrong. He dropped his 400 gallons of retardant early and a bit off course. Witnesses said that the nose of the plane came up as would be expected, the plane then pitched steeply downwards. It hit the ground and exploded in a fireball.

Initial National Transportation Safety Board reports indicated that some pilots on this and other fires were making their final approaches at too low a speed for the weight they carried. It would seem from that statement that they suspected that the crashed aircraft had stalled. In other words it was going too slowly for the wings to maintain the lift required to hold the plane up. Officials grounded the other 26 Dromaders to retrain the pilots on operational limitations of the planes in firefighting applications.

The crashed plane was completely destroyed by the fire. The investigators could not find any specific problems from what little evidence was left. The maintenance records were burned up in the crash. Wayne probably died instantly.

Almost a year after Turner's death, a Dromader pilot in Nevada crash landed shortly after takeoff when he suddenly lost power. At that point he dropped his load and managed to glide to a rough landing on a dirt road. Shortly after the investigation of this incident, the Department of the Interior issued an alert for pilots to take extra precautions when flying fire missions in hot weather. During engine runup prior to takeoff, the pilot acknowledged that he had not tested his emergency fuel pump. Premature fuel vaporization due to heat caused what is commonly referred to as a "vapor lock" was determined to be the cause. When fuel is heated to its boiling point prior to entering the cylinder, the pressure created can stop liquid from reaching the fuel pump, carburetor or injection system when it forms a vapor bubble somewhere in the fuel system. The emergency procedure would be to start the backup pump and restart the engine. But at low altitude the likelihood of a successful restart in time is slim.

Another problem that SEAT Pilots have reported and some have died from, is loss of power from fuel starvation when the wing fuel tanks are at $\frac{1}{4}$ tank or less. If these tanks are not balanced, the extreme demands of a drop run may cause an un-venting of the fuel outlet port, there is simply no fuel at the pick up tube so the fuel pump just sucks air. DOI Aviation Management made several recommendations: be sure that the aircraft is trim and fuel levels are equal in each wing; don't fly with less than $\frac{1}{4}$ tank in either wing; avoid prolonged holding of turns; avoid operating in turbulence with less than $\frac{1}{4}$ tank in either wing.

Hydraulic system failures have also been documented in the SEATs. The hydraulic systems typically control flaps, ground steering and brakes.

The exact cause of Wayne Turner's fatal crash has not been determined. It was the third fatal crash of an M-18 Dromader owned by New Frontier in as many months.