Biography of WILLIAM E. ATWOOD

Modeler since the late 1920s July 22, 1910 – April 28, 1978

Written & Submitted by CM (9/01) Transcribed by NR (9/01) Formatted & Edited by SS (10/02), updated by JS (10/07)

Career:

- Designed and built his first engine, a 30cc water-cooled, in 1932
- Designed the Baby Cyclone engine in 1933; 20,000 were produced
- Designed and produced the Torpedo engines; sold to K&B
- Designed and produced the Triumph line of engines in 1948
- Joined Bob Holland to produce the Wasp .049 in 1949; it later became the Atwood .049
- Joined Cox manufacturing in 1960 and designed the Tee Dee engines and the Conquest engines

Honors:

- 1979 – National Free Flight Society Hall of Fame
- 1982 – Model Aviation Hall of Fame

The following biography was researched and compiled by Charles A. Mackey.

Bill Atwood

By Charles A. Mackey

Bill Atwood was one of the most prolific model engine designers of all time. He was a fierce competitor, a holder of model aviation state championships and holder of many world records.

When I went to work at Cox Hobbies in 1965, I was introduced to Bill and I found him to be a congenial, soft-spoken cooperative person. “Are you the Bill Atwood of Atwood Engines?” I asked him. He just nodded his head and gave me a slight smile. Wow, the real Bill Atwood! I had to tell him how pleased I was with the Atwood Champ Model Engine. The only engine that I could find in 1947 that would give me to power and dependability I needed for my Control Line stunt ship designs. Bill was a delight to work with. If you could show him a way to make his engines better, he was eager to make the change, unlike most of the engineers who resisted change like the plague!

I did not know of all of Bill Atwood's other accomplishments and he was not the type to tell anyone. Dale Kim reports that there were many restraints put on Bill Atwood's designs by Roy Cox in order to facilitate the manufacturing process. His famous TD line of .049 and.051 engines was not his first designs but a compromise to reduce manufacturing costs. These engines were world leaders for several decades despite the compromises. I sometimes wonder what Bill's first designs that were not compromised would have been like. Dale Kirn tells me that when the manufacturing pressures would build up, Bill would simply say, “I'm going for a ride,” hop on his motorcycle and return in a couple of hours refreshed and ready to tackle the problem.

Bill in 1952

Bill's last hobby was restoring automobiles. Whenever I think of Bill, I remember the time he offered to sell me this Mercedes Benz coupe for $1,200, but I was afraid I could not get used to the gull wing doors.

When I was asked to write the biography of Bill Atwood, I estimated it would take months of research to fill in the early years of Bill's activities. I was pleased to learn that many excellent bios had been written about Bill and this would be a simple matter of editing. They are:

1. Model Aviation Hall of Fame Application by Art Swift
2. "The Atwood Story" by Dr. T.C. O'Meara, Model Airplane News magazine, January 1979
3. "Do You Speak Model Airplane" by David Thomberg, page 293

The following information was taken from a Model Aviation Hall of Fame application that was submitted by Arthur P. Swift and Dale Kirn on behalf of Bill Atwood in 1982. Much of the content was taken from the January 1979 article in Model Airplane News magazine about Bill Atwood. This article is reproduced following the Hall of Fame application.

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2 March 1982

Hall of Fame Committee
Academy of Aeronautics
815 15th St. N.W.
Washington, D.C. 20005

Subject: Nomination of William E. Atwood to the Model Aviation Hall of Fame

William E. Atwood was born on July 22, 1910, in Riverside, California. His early interest in Aviation was apparent when, at the age of 15, Bill constructed a 20-foot Wright Brothers' hang-glider, which he flew with the Riverside Glider Club. Bill Atwood competed in his first Nationals competition in 1927 at Memphis, Tennessee.

In 1928, Bill was attracted to the relatively new sport of model boat racing. While in high school, he designed and built a 30cc water-cooled boat engine with which he competed against other enthusiasts for the next four years. During this period, he learned to fly full-size power aircraft, and also competed in sailplane events at Pacific Palisades in a 60-foot sailplane that he designed and constructed himself.

In 1932, Bill designed and built a 30cc air-cooled model airplane engine. This engine was installed in a nine-foot mode of his own design. The longest flight recorded with this combination was 26 minutes, carrying the neighbor's cat as cargo!

In 1933, Atwood designed a new, smaller model airplane engine of .36-cubic inch displacement, which he flew at the 1934 Nationals at Akron, Ohio. Bill won the California State Free Flight

Championship in 1934 and 1935 with this engine. Major C. C. Moseley of Aircraft Industries Corporation saw the potential of this little engine and bought the design. Atwood left his aeronautical engineering job with Douglas Aircraft to work for Moseley. This engine was named the Baby Cyclone, and nearly 20,000 of these were produced in Curtis Wright Tech. shops the next four years. (It had previously been reported erroneously that Mel Anderson had designed the Baby Cyclone engine.) Bill Atwood's winning gas models, the California Chief and California Champ, were also kitted by Aircraft Industries.

During the production period of the Baby Cyclone Bill Atwood renewed his interest in model boating, Bill designed a 15cc fore and aft rotary air induction boat engine. Bill was determined to break the world's speed record, and in 1938 succeeded in breaking both the ¼ mile and 1mile records. The engine was the fantastic Silver Crown Champion and the records set remained unbroken for the next five years. His Aero-Marine Model Lab produced engine kits and boat plans for this record holding combination. Bill left Aircraft Industries Corporation in 1938 and went to work for Automatic Screw Machine Company in Los Angeles where he designed and developed the Phantom line of Bullet and Torpedo engines.

Model car racing became popular in 1939 and Bill, naturally, believed he could produce a better car and engine than was being used at the time. He designed and manufactured a revolutionary line of 10cc rating engines known as the Crown Champions and produced three different models of racecars to utilize these engines. As a result of the success of the Crown series, Bill joined Shaw and Kaw in 1941 to produce the latest line of Champion single intake, dual rotary valve engines. These engines were produced until Bill joined the Army Air Corps as a glider instructor in 1942.

After World War II, Bill joined with Wetzel to resume production of the Champion engines. These engines were popularized in Control Line stunt by Davey Slagle who won everything in sight, including the Nationals and the Plymouth Internationals. The Torpedo engine design was sold to K&B Manufacturing Company, which went on to product the very popular engine.

In 1945, Bill decided not to compete with his engine customers, and turned considerable talent to indoor flying. Bill Atwood won four consecutive indoor wins at the Nationals from 1945 through 1948.

In 1948, Bill introduced the Triumph line of high performance, lightweight engines. The unique construction of the Triumph engine was another innovation of Atwood’s. The molds for this engine were greatly simplified by pulling the bypass cores from the bottom of the cylinder and then bolting on a pan, similar to an automobile engine. The plenum chamber intake manifold called, Ropak Induction by Atwood, was also unique. These engines were glow and ignition models.

In 1949, Bill joined forces with Bob Holland to produce the powerful Wasp 1/2-A engine line. Those engines were later marketed as the Atwood .049.

In 1952, Bill once again won the indoor stick event at the Nationals at Los Alamitos. In 1953, Atwood went on to produce the Cadet, Signature, Shriek and Super Signature of the Atwood .049 line; these continued through 1956. During 1953 Bill Atwood introduced the O.S line of Japanese glow engines to this country. Atwood also produced engines for Wen-Mac, Jim Walker and Pagliuso during this period. The Wen-NBC spring rewind starter was another of Atwood's innovations.

In 1964, Bill Atwood designed and produced the single and twin cylinder outboard engine. These engines introduced the flexible drive shaft concept, which is still being used on the K&B line of contemporary outboard engines. Bill's interest in steamboats was stimulated by the movie, "The African Queen," and in 1956, a steam-powered model launch called the Jungle Boat was designed and manufactured by Atwood. This project turned into a financial disaster and Bill withdrew from the industry as a manufacturer.

Atwood joined Roy Cox in 1960 to design and supervise the production of the classic Tee-Dee line of engines, including the amazing .010 – the smallest production engine produced up to that time. In 1961, Bill started back into indoor competition with a vengeance, and in 1963 after a tremendous round of eliminations in Santa Anna, Bill Atwood won a berth on the FAI indoor team.

In 1969, Atwood designed a radical new engine for Cox. These engines, known as the Conquest series, were made in a .35 and .40-cubic inch displacement. They featured hard chrome plated aluminum bore, which eliminated the conventional a heavy steel sleeve. These engines were similar in construction to the Triumph, retaining the detachable pan on the block, but incorporating an integral cylinder head and a ball bearing crankshaft.

The Cox Conquest was Bill's final design before be retired from L.M. Cox in 1975. Bill devoted his remaining years to Radio Controlled (RC) glider design and flying. Bill had been actively engaged in our hobby for over 50 years.

He passed away on April 28, 1978. His genius, influence, and contributions have been felt by three generations of modelers.

The following article ran in Model Airplane News magazine's January 1979 issue on page 42.

The Atwood Story

By Dr. T.C. O'Meara

As I write this account from information given to me by Bill, the world of modelers will be learning of the loss of one of its most prolific and successful engine designers. This article is a tribute to and chronicle of the accomplishments of a man who was my friend for 32 years.

Behind William E. Atwood's mild-mannered, shy exterior was an intensely focused drive to win. At competitions he spent, little time in conversation for victory was his goal and careful attention

to model performance was needed. People nearby would hear him mutter what, for him, was an eternal question, “Now, why did it do that?” Although Bill had other interests, flight was the chief one.

At age 15, he built his first aircraft, a 20-foot Wright Brothers' hang glider, to fly with the Riverside, California, Glider Club. Developing his flying skills, by 1930 he had earned some flight instruction in Curtiss Jennies and completed (in 16 months) a winning sailplane with a 60-foot wing. In 1946, Atwood decided to withdraw from competition in engine-powered events and he turned to indoor events. One of his peak achievements was qualifying for the U.S. F.A.I. indoor team of 1963, but, unfortunately, the event was canceled and he failed to make the team in 1964. The last years of his life, he flew only RC sailplanes.

Other activity in Riverside of interest to young Bill was the new hobby of gasoline-powered model boat racing. A machinist friend, Bert Cundiff, was buying Westbury engine castings from England and making model boat engines. In 1928, after studying Westbury's articles and Bert's engines, Bill, with his perennial thought of “I can do better than that,” designed his first engine. This 30cc displacement water-cooled boat engine was made with parts cast by Atwood in his backyard while still in high school.

In Bert's shop, he machined the castings and made other parts. The two-piece crankcase contained a crankshaft-driven rotary intake valve and supported a cast-iron cylinder with a screwed-on bypass passage. The aluminum piston had one ring and the combustion chamber of the head was contoured for better gas flow. For the next four years, he made and ran boat engines with local modelers, including Maynard Clark and Mel Anderson. He also piloted Jennies, flew indoor models and competed at Pacific Palisades (near Los Angeles) in sailplanes he had built.

Scaling down his aircraft in 1932, Bill built a nine-foot span model of spruce covered with butcher paper for power. He designed a 30cc aluminum case engine with cooling fins on the iron cylinder. This combination, consuming a quart of fuel, he flew for a 26-minute flight, even before Maxwell Basset gained notoriety with his gasoline-powered model. Unpublicized, though, especially in Riverside, was the fact that Atwood's plane made the flight carrying his neighbor's cat as cargo.

His competitive nature spurred Bill to develop an improved aircraft engine in 1933, one that utilized an iron cylinder with a shrunk-on finned aluminum sleeve for cooling. He and Irwin Ohlsson took planes to the 1934 Nationals at Akron to challenge other engine-powered entries. Unfortunately, they mixed fuel using light grade oil and their engines failed to perform well in the hot weather there.

1935 was the year Bill Atwood won the California State Championship. He gave Mel Anderson half the credit for the use of shaft rotary induction in the engine he designed to win the event. Major C.C. Moseley, an entrepreneur in the aircraft industry, bought the design and hired Bill to produce and develop the engine. Many student pilots at Grand Central Airport in Burbank,

California, earned their instruction by working on Baby Cyclone production. Mel Anderson and Ira Hassad were employed there; Mel remained to design the Super Cyclone engine for Moseley.

While working on Baby Cyclone production, Atwood continued in boat competition as well as improving his piloting skills. He took on the challenge of beating the 31 mph world record for boats held by Zukor of France. The engine Bill developed in his home shop was of 15cc displacement, air cooled and had fore and aft dual shaft rotary carburetion. In 1938, he achieved official record runs of 44 mph for ¼ mile and 38 mph for one mile. These records remained unbeaten for five years.

Feeling financially un-rewarded, Atwood left Baby Cyclones to Moseley in 1938 and went to work for Automatic Screw Machine Company (Phantom Motors Division, Hi Speed Division). Here he made one of his most significant design innovations first seen on the Phantom engine. Until then, induction bypass passages had been fastened to the outsides of cylinders by welds, clamps, or screws. Bill devised the "drop-in" cylinder, which utilized an extended crankcase casting to provide a passage for induction gas flow between crankcase and combustion chamber. This method reduced weight and distorting stresses upon the cylinder walls and is used on most present-day model engines, as well as on some industrial two-cycle engines. Production of the Phantom, Bullet, and Hi Speed engines was so rapid that design flaws were ignored initially. Notable among these were too-thin heads, which frequently warped and leaked compression. To reduce corrosion of the magnesium castings, some models were given a crackle-finish paint coating. Until the Torpedo, Atwood's aircraft engines featured updraft intakes to prevent flooding by the gravity-fed fuel. When Bill left Automatic Screw Machine Company, he retained all rights to the Torpedo and Bullet designs. The Phantom P-30, Postwar Bullet 100 and Torpedo Special were not Atwood designs.

While still with Phantom Motors, he became interested in the racecars at the rail track of Tommy and Harry Dooling in nearby Culver City. Watching the Doolings and Dan Bunch running their Dennymite and Brown Jr. powered racers, he thought to himself, "I can do better than that!" In his home shop, he built a 10 cc engine, which he installed in a Bunch car and proceeded to amaze the car buffs. By 1939, he had improved this design and was selling some completed engines, as well as casting sets. These engines were the Crown Champion series. Initially, he used sand castings with dual carburetors with drum type and crankshaft rotary valves. When dies were made, the smokestack single carburetor supplied both intake valves for car and aero versions. Because of the success of the racecar engines, two men, Shaw and Kaw, convinced Atwood to leave Phantom and join them to produce the latest Champions. Their association was brief.

Bill then joined Wetzel to continue development and production until World War II intervened. Bill worked as a toolmaker for a time, continuing with Champions as a hobby activity. When he became a glider pilot instructor for the Army Air Corps, Wetzel kept the dies and parts inventory, assembling a few engines from pre-war parts stock.

In early 1945, as war production was slowing down, metals were once more available in limited

quantities. Atwood and Wetzel began producing Champion model engines. As this partnership split, each one thought that he had rights to earlier Atwood designs. During the war, the dies for the Torpedo had been lost. Wetzel transferred the Torpedo to Miniature Motors; Bill sold the Torpedo name and good will to John Brodbeck (the B of K&B), with a promise never to compete with John in the .29 class. In mid-1945, Bill set tip shop in the Ace Model Shop in Pasadena, where he produced magnesium-casting Champions. The Model H had a capped Meehanite piston and radial fins on the head. The change to Model J entailed streamlined fins on the head, a ringed aluminum piston and drilled cylinder ports. Even with these alterations, production could not keep up with demand. Ken Adams had greater production facilities, so Atwood joined him in Burbank. A redesign at this time resulted in the model JH Super-Champion with aluminum castings, higher compression, squared ports and a smaller timer assembly. A straight in carburetor was available chiefly for inverted operation.

The dissolution of this partnership resulted in the reestablishment of Atwood Motors, at first selling Super-Champions, then, without timers and with the inverted intake, Glo-Devils. In 1948, Bill brought out the Triumph .49 and .51 in both spark and flow ignition versions. This design was used by Gene Stiles to bring to the U.S. the first Free Flight speed record (81.587 mph) with his June 1949 flights. His plane was placed in the Smithsonian Institute.

Meanwhile, the appearance of the K&B Infant Torpedo opened up a new era in model power, made possible by glow plug ignition. Engine designers began thinking "small," Atwood included. Putting his head together with Bob Holland's resulted in design and production of the first Wasp .049s – outstanding performers among the 1949 glow engines. When Wen-Mac and Jim Walker needed engines for their toy-type airplanes, Atwood and Holland were the suppliers. They also produced B and B Timertanks (possibly inspired by the pre-war Korda timer tank). In 1953, Bill and Bob split over production philosophy with Holland taking the rights to the Wasp. Atwood continued to improve the basic design with versions named Atwood, Cadet and Signature – all in .049 and .051 sizes. He made a .15 version, but its power was not competitive and none were produced for sale. The Atwood outboard engine innovated coupling the air or water-cooled power head (/049 or .051) to the propeller with a coil spring. They were marketed by Wen-Mac for whom Bill designed a new engine. He also reworked Pagliuso's Pogo helicopter engine design. In 1955, to beat competing products, he designed the last of his own engines, the Shriek, first marketed in 1956. Following this, the shop was converted for production of the Jungle Queen, a steam-powered model launch inspired by the movie "African Queen." This venture ended in financial disaster and Atwood sold out in 1959.

Bill's ingenuity was thus available in 1960 when Roy Cox needed help with a .010-size engine he hoped to produce. Roy wanted to continue using reed-valve induction in all his engines, but the tiny one would not work. He employed Atwood to find a solution. There might never have been a Cox .010 marketed if not for Bill's wish to coax enough power out of the reed-valved Olympic .15 to make Cox a competitive name in FAI events. These experiments he did on his own time. He finally abandoned the reed valve, put a drum rotary (like Champion's) in its place, and used a different glow head. Because of the significant increase in power, Cox was persuaded to produce a few for use in FAI competition. The front rotary experiment was almost

abandoned during testing because Bill was using a stock head instead of a "hot" one. He then sold Roy on the idea of the front rotary valve for competition engines, designated the Cox TD line. Applying this design change, Atwood's first handmade tapered-cylinder .010 prototype ran at a steady 26,000 rpm. To successfully produce this tiny engine called for holding tolerances up to 25-millionths of an inch. Toward keeping Cox engines in competition, Bill developed .35 and .40 engines, of which a few were given to prominent modelers for field testing in 1967 and 1968. Predictions for sales volume versus production cost were unfavorable; therefore, this excellent engine was never marketed. From 1970 on, Bill Atwood was project engineer for Cox. During those years, he designed a pull starter for cars, helped develop bicycle and industrial engines, and directed upgrading of the model engine lines.

The Cox Conquest .15 was the last Atwood design to go into production. Bill retired in 1975, but remained a consultant to Cox as the Conquest production progressed. He was thus active as a competition pacesetter until his death on April 28, 1978, 50 years after he built his first engine.

The following article was written by Art Swift and dated March 1986. Unfortunately, no record was kept as to where the article was published. It was not found in the March 1986 issues of Model Airplane News magazine, Model Aviation magazine or Radio Control Modeler magazine.

Bill Atwood – Moving Model Maker

By Art Swift

Art Swift has furnished us with a rather unusual piece of research for this issue. It represents considerable correlation between what Bill Atwood was building where and when!

Note that at times he had more than one iron in the fire. 1945 alone found him in no less than five different places. Your wonder how he found time to design and build all of the engines he did!

It also, is an illustration, although Bill Atwood was an extreme case, of how it is some times difficult to trace where some of our little gems were built. Atwood certainly was not the only one to move his operations. It is just that he stayed at it longer than anyone else did!

We will not go into the reasons for many of these moves. Just suffice it to say that Bill Atwood was one "Moving Model Maker!"

Bill Atwood – A Chronological Record of His Engines and Business Locations

Year	Business Location	Engine(s)
1934	Aircraft Industries, Inc. Grand Central Air Terminal Glendale, California	Baby Cyclone
1938	Phantom Motors Automatic Screw Machine Co.	Phantom and Hi-Speed

	800 E. Gage Ave. Los Angeles, California	
1938	Aero Marine Model Lab 305 W. Dryden Glendale, California	Silver Crown casting kits
1938	359 E. Six Foot Indian Street Dept. MN Los Angeles, California	Silver Crown casting kits and boat plans
1939	Hi-Speed Division 800 E. Gage Ave. Los Angeles, California	Hi-Speed and Bullet
1939	Hi-Speed Sales 640B McKinley Ave. Los Angeles, CA	Hi-Speed, Bullet and Torpedo
1939	Wasp Model Supply 4128 Wade Ave. Venice, California	Atwood Special engine and Wasp Special racecar
1940	Champion Products Co. 1104 Architects Building Los Angeles, California	Silver Crown Kits; Blue, Green, Red and Purple Crown engines; Champion racecars
1941	Champion Products Co. 1104 Architects Building Los Angeles, California	Champion engines
1941	Phantom Motors 800 E. Gage Ave. Los Angeles, California	Phantom Torpedo, Bullet and P-30
1942	Champion Products Co. (Shaw & Kaw) 4513 E. Gage Ave. Bell, California	Champion engines
1942	Wetzel Motors 420 S. Manhattan Place Los Angeles, California	Champion, Phantom, Bullet and Torpedo
1943 to 1944	These were the war years; Bill Atwood was in the Army Air Corps training glider pilots.	Wetzel was turning out a few engines from the remaining stock.
1945	Wetzel and Motors 4509 Anaheim/Telegraph Road Los Angeles, California	Champion engines and bullet
1945	Miniature Motors (Fearless Camera Co.) 8400 Higuera Street Culver City, California	Atwood Bullet
1945	K&B Manufacturing Company	Atwood Torpedo

	(Kading and Brodbeck) 6901 Eastern Ave. Bell Gardens, California	
1945	Atwood Motors 1655 E. Colorado Blvd. Pasadena, California	Champion Model H
1945	Atwood Motors (Ace Hobby Shop) 808 E. Colorado Blvd. Pasadena, California	Champion Model H and Model J
1946	Atwood Motors 279 W. Valencia Burbank, California	Champion Model H and Model J
1946	Atwood & Adams Manufacturing Co. 732 N. Lake Burbank, California	Super Champ JH and Champion Model I
1946	Phantom Motors Distribution Co. (Carlson and Anderson) Automatic Screw Machine Co. 806 E. Gage Ave. Los Angeles, California	Phantom P-30
1947	Atwood Manufacturing Co. 734 N. Lake Burbank, California	Super Champion JH
1947	Atwood Manufacturing Co. (Atwood Products) 147 Pasadena Ave. South Pasadena, California	Super Champion JH
1948	Atwood Manufacturing Co. (Atwood Products) 147 Pasadena Ave. South Pasadena, California	Super Champion JH, Glo-Devil, Super Champion DR, Glo-Devil DR, Triumph 49 and Triumph 51
1949	Atwood Manufacturing Company 4738 S. Durfee Ave. Pico, California	Triumph 49, Triumph 51 and Wasp 049 (Holland)
1952	Atwood Manufacturing Company 4738 S. Durfee Ave. Pico, California	Wen-Mac .049
1953	Atwood Motors 3716 Park Place Montrose, California	Triumph 49, Triumph 51, Atwood 049, Atwood 051, OS 29 and OS 216 (Imp)
1954	Atwood Motors 3716 Park Place Montrose, California	Cadet, Signature, C49, outboard and inboard

1955	Atwood Motors 3716 Park Place Montrose, California	Signature .051
1956	Atwood Motors 3716 Park Place Montrose, California	Shriek .049 and .051
1958	Atwood Steam Products 3716 Park Place Montrose, California	Jungle Queen steam boat
1958	Signature Engines Tulsa, Oklahoma	Shriek .049
1959	Signature Engines Tulsa, Oklahoma	Shriek .051 and Super Cadet
1959	Pagliuso Engineering Company 113 W. Harvard Street Glendale, California	Pagco XF-9 (redesigned by Atwood from Pogo .09)
1959	L.M. Cox Manufacturing Co. 730 Poinsettia Street Santa Ana, California	Olympic and Sportsman .15; TD .010, .020, .049. 051. 09 and .15; Mk II .15; Concept .35 and .40; and Conquest .15 and .40

Bill Atwood worked for Cox until his death on April 28, 1978.

In addition to all of the engines listed above, which were Bill Atwood designs, the list of model engines strongly influenced by his designs and innovations is almost as long.

Atwood invented, discovered, designed or however you want to class it, the rotary valve intake for these miniature engines. He was constantly working on the engines of the future and managed to stay one jump ahead of many of his competitors. He was always trying something different. It did not always work, but the many different designs proved he was not afraid to try.