

D-A - A History... from the D-A Weekly Newsletter – issues as indicated.

Number 1625 – January 24, 1969 Part I

The history of the D-A Lubricant Company, Inc. is a very interesting story, not alone because of its achievement and success, but because it was born at the same time as another great industry, and has had an active part in its growth and development ever since, from the standpoint of service and of specialization.

In 1919, just following World War I, engineers and designers were beginning to apply the knowledge of mechanical design gained during the war to industrial and heavy-duty equipment improvement. They began to think in terms of complex gear assemblies, more horsepower, heavy pressures, and higher shaft and journal speeds, in order to make their machinery more powerful without reduced loss of efficiency.

Greases of that day were still being built around the principles of “wagon wheel” lubrication. Grease was grease ... so long as it looked and felt greasy. The original D-A Lubricant was produced in 1919 to meet the requirements of the then newly designed heavy-duty equipment. It did the job!

For more than 50 years, the company has followed the same policy. It has maintained its identity with the heavy-duty equipment field. It has stayed abreast of the times ... ready with a specialized product to fill new or changed lubrication needs as equipment design changed or improved.

In the autumn of 1919, a boxcar uncoupled from the freight train, which had pulled it from Washington, D.C to Indianapolis. A switch engine shunted the car up a spur line to a spot near 29th Street and left it there. Although few people were aware of it, the D-A Lubricant Company had arrived in Indianapolis.

The firm got its start in 1919 when Frank L. Binford and some associates purchased the patents for an asbestos base grease from two Washington business men named Dorsch and Atkins whose initials became the company name.

The first building was built in 1920. It was a 30' by 50' structure built at 1331 West 29th Street (the present site of D-A) by Mr. Binford and Mr. H.B. Burnet for \$4,000 – and the land was valued at \$2,000. Burnet was one of the original business associates of Mr. Binford in the new venture and was also a partner of the lumber business, which later became known as Burnet-Binford Lumber Company.

Inside the little frame building, the asbestos base grease was manufactured and was the company's original product. It came in three grades (light, medium and heavy). Initial marketing was a struggle as it always is in a pioneering effort. However, this was a spectacular product when compared to the primitive axle greases available at the time and was quickly gaining acclaim in various industrial applications.

Number 1626 – January 31, 1969 Part II

The initial D-A marketing was attempted in the textile industry in the southeast part of the country. D-A #1, 2, and 3 was rapidly gaining a good reputation as a spindle lubricant in the industry's looms and weaving machines of the time.

Word of this new lubricant spread into the “boondocks” and a crawler tractor service man out of Atlanta, GA tried it out in the rollers and idlers of one of his customer's tractors. As the story goes, a tractor owner was attempting to snake logs out of a swamp and the grease then available was mixing with the water and washing out of the rollers

every few feet. When D-A #2 was used, they were able to make several trips from the woods to the haul road and back before re-greasing.

This discovery was flashed back to the tractor manufacturer and in a short time; D-A was the only track roller grease they would recommend. This was about the time Best and Holt Tractor Companies merged and formed Caterpillar Tractor Company of Peoria, IL.

In many parts of the country, Caterpillar distributors warehoused and sold D-A #1, 2 and 3 with each new crawler tractor. This arrangement continued until the 1930's when the buying power of the major petroleum companies dictated that the Caterpillar Company should not be partial to one particular lubricant.

Going back a few years, an addition to the original frame building was authorized in November 1920 at a cost of \$2,000 (the newest addition to the D-A office buildings which was completed in 1968 was approximately \$300,000.)

Early records show that Mr. Frank Binford received a salary of \$200 per month as President. In 1924, Mr. Binford held controlling interest in the 320 shares outstanding of the company stock. Early sales figures were as follows:

<u>Sales Year</u>	<u>Lbs. Sold</u>	<u>\$ Sales</u>
1924	608,487	\$ 60,000
1925	1,200,661	115,000
1926	2,178,212	200,000
1927	3,367,619	300,000

In connection with the above sales figures, it is interesting to note that Mr. Ray Taylor was employed in December 1924. His first D-A order was in the form of a requisition dated December 1924 from the North Carolina Highway Commission, Biltmore, NC for the equivalent of 14 drums of D-A Lubricant. Ray was the oldest employee in years of service to the company during its 50th anniversary.

Another milestone in the company was that D-A paid its first dividend in 1928 when it was nine years old.

Number 1629 – February 21, 1969 Part III

By the end of 1922, D-A had sold quite a number of cotton mills and increased their sales force to 3 men. It was during the year 1923 the crawler type tractor field was discovered and the company lost interesting the cotton mills and automotive field.

Historically, the original semi-fluid D-A #1, #2 and #3 products are thoroughly documented. The second product, D-A #0, #00 and #000 was introduced within a year (approximately 1923) after our initial success in the track roller application, but it was so over-shadowed by its glamorous "asbestos grease" big brother that not a single word is on file of when or why it was added.

In researching the recommendations and literature of the 1920's, we learn that the lubricant SAE numbers have not always been the way we know them today. The early D-A #0 was known as an SAE #160 and #00 was SAE #110. The above became SAE #250 and #140 respectively in the late 1930's.

We have in our possession the very first piece of D-A advertising, which is a brochure describing the product and its application and carries the Washington D.C. address. We hope to have it reproduced for the Newsletter at a later date. Another one of the early

company brochures gives the reason for the D-A trade name: DepenD-Ability. We'll wager you thought it came from Dorsch and Adkins.

Another interesting fact is that the first price of D-A lubricant was 20¢ per pound. As sales increased through the 1920's, this was reduced to 18¢ per pound, then 16¢ per pound. Along the same line, commissions at this time were 1/8¢ and 1/10¢ per pound.

By the end of 1928, D-A had had 5 years of progressive prosperity. Every year was 50% to 100% increase over the preceding year. Every Caterpillar dealer in the United States was selling and boosting D-A Lubricant.

Then, the Caterpillar Tractor Company ordered their dealers to discontinue stocking and selling D-A Lubricant because of the pressure placed on them by the major petroleum companies not to show partiality to one particular product. This was a blow at first. D-A had no public warehouse setup, nor had D-A any salesmen (at least, many) that could go out and sell direct.

Then came the year 1932. The country was in the depths of the depression. Banks were closing and there was to be a new President. The outlook was very discouraging. Would D-A close with the banks? Salaries had been cut 20% or more, the price of lubricant had been cut to 14.5¢ per pound. Everyone in the organization cooperated and did their part without complaining. There was just one consolation; D-A had successfully proved that they could sell their product direct as well as through dealers.

Number 16230 – February 28, 1969 Part IV

Ivan (Ike) Buckler was the first plant employee – hired July 18, 1925. He was in charge of the two other plant employees. There was an office with one desk and one typewriter but no stenographer or bookkeeper so the office work was done by Ike. There was also a “one-man-power” elevator and pulling it up and down was a backbreaking job. Ike retired April 15, 1959 after 34 years of service and lives here in Indianapolis. It was not too long ago that he came to visit us.

Vaughn Bramel was employed April 12, 1929 and retired April 12, 1966 after 37 years of service. Vaughn stops in frequently to see us and told us recently that when he came with D-A, there were 3 plant employees and 8 members of the office force and everyone put in 50 hours a week or more. Vaughn was plant manager for 8 of his 37 years and had the distinction of being late for work only once in those 37 years.

Oakley Pribble was one of those first three plant employees having been employed September 5, 1925 and retired in April, 1962 and died shortly thereafter of a heart attack.

Another great favorite was Homer Wright employed May 16, 1927 and retired June 1, 1961. Homer started out as an office clerk and at one time or another during his years with the company had responsibility for billing, inventory, shipping and later purchasing and became a Vice-President of the company in 1955. Homer, still a stately man in stature, always wearing a red carnation in his button hole, used to come see us occasionally. We hope the computers didn't run him away.

Jess Hughes joined the D-A sales force March 22, 1928, selling in Indiana and northern Illinois until his retirement 30 years later December 31, 1958. Jess is a very young 78, still lives with his wife, Mary, in Greenfield, IN and still has a full head of jet-black hair. He was always a great favorite, both in the office and in the territory and still has Indiana customers asking about him like all great salesmen, he hated reports but we're making an effort to see if he'll contribute some memoirs to our 50th Anniversary.

Paul (Pete) Shaffer, now deceased, came with D-A April 29, 1929. He sold in southern Illinois until poor health forced his retirement in 1955. Pete had 600 Township and County accounts and 90% to 95% used D-A in one form or another. He was immensely proud of his cars (started covering a 1929 territory by train) and was the first salesman we know who used undercoating – he would find a freshly oiled country road and drive on it slowly for hours.

Many of us, both here in the office and in the field, remember all of these gentlemen who played a great role in the history of D-A and contributed in no small way to its progress and success. There were other important personalities of the Twenties, but none of us now working in the office know very much about them. It is not our intention to omit any names – we just don't know the facts.

Number 1635 – April 4, 1969 Part V

1934 was the year of D-A Motor Oil and J. Bentley Candy. Of these two products, it would be hard to say which was of the most value, but Ben is the survivor. Since D-A Motor Oil was the company's first oil, we'll take that subject up first and leave Ben for later.

With the installation of the first blending plant in 1934, the company came out with its first oil – D-A Motor Oil. Most every day there would be orders for 20 drums in the morning's mail and on a few days, orders for 50 or 60 drums were received. The healthy thing about the oil business was that 85% of the business was from satisfied repeat customers.

The big value in those days of having this superior motor oil was to use it to secure more D-A Lubricant business. The company's main objective was to keep D-A Lubricant sales going up and never put D-A Lubricant sales second to D-A Motor Oil sales. The company made their reputation and built their business on D-A Lubricant and without the lubricant they could not sell oil alone and stay in business in those days.

Having proven to the tractor owner that D-A was the best lubricant for his equipment, they had gained his confidence so he bought the oil, found it to be a superior product and became a steady oil customer as a result. This resulted in extra income for both the company and the salesmen.

It could hardly be expected that there would be no complaints on D-A Motor Oil from time to time, but there were very few. Every complaint that come to the company's attention was thoroughly investigated and in every instance, it was proven that the oil was not at fault and that D-A Motor Oil was a superior product. D-A was proud of this fine record and worked hard to maintain and improve it.

It is interesting to note that early management stated that it had been proven that giving each salesman a monthly quota on D-A (pounds) was decidedly beneficial to him and to the company, so each salesman was responsible for fulfillment of his quota in addition to a monthly oil quota and he was held accountable for failure to meet his quota.

The company saw D-A Motor Oil earn its deserved recognition from the dealer and the user on the soundest of all bases ... its superior performance and economy in service. This was accomplished not with but in spite of any official blessing or being "carried under an umbrella" of "official approval" ... confirming again unshaken faith in company policy that quality needs no apology but is bound to win out through sheer force of superior merit.

An early company record states: "... focusing every man's attention on his and our job and problems, so that each may see the picture as we see it results in all of us doing a better job of selling; increases the standing and business of ourselves and our company; and makes us all happier in our work and more on our toes than ever before."

Number 1636 – April 11, 1969 Part VI

As mentioned in Part V of the D-A History, J. Bently Candy first joined D-A in February 1934. He was hired from Tiona Petroleum Company, Philadelphia, PA (one of our earliest base oil suppliers) as a chemist to start our first laboratory. He also blended D-A's first engine oil in a 500-gallon tank, which is still in use.

Ben apparently made a big splash wherever he went because about two weeks after his arrival, he jumped in the canal alongside the D-A plant and rescued three women whose car had gone in and sunk. Unfortunately, another woman was thrown out of the car before Ben got to them and she was drowned.

In his first month with the company, Ben became dissatisfied with his salary and apparently made a rather forceful plea for a \$50 raise. He is still chuckling because what he meant was \$50 more a month and when the raise was granted, it came through \$50 a week. We can only assume that his performance up to that time was up to par.

As Ben recalls, it took the better part of a year to obtain delivery on the necessary laboratory equipment. Since there were only three other men in the plant (Buckner, Bramel and Pribble) it was impossible to disappear or hide so he became one of the leading contenders as to who could unload cars, paint and fill the drums the fastest.

When the D-A laboratory did get into operation toward the end of 1934, it was the first of its kind in the country, fully as outstanding in 1934 as our present lab is in 1969. In addition to quality control, new product research and testing, we were able to buy base oils in tank cars instead of by the drum. And with the advent of this new facility, Ben and Louis Graham made the first formal manufacturer's calls to coordinate the latest equipment and lubricant data.

Ben's brief laboratory tenure came to an end after a trouble call in Minnesota with Ralph Anderson in 1936. They solved the problem and obtained a carload order and Ralph was so enthusiastic he called Mr. Frank Binford and told him Ben was in the wrong job. From that day on, he was assigned to sales and in 1940 became General Sales Manager. Wade Newcombe replaced Ben and contributed his full share to our technical growth. After Wade left D-A in 1941, he became National Sales Manager for Wyandotte Chemical Company and later Monsanto Chemical Company.

As most of you know, Jim Coover took over from Wade and then Jess Smither from Jim, who you can see the caliber of men we have had in charge of the D-A laboratory.

Number 1638 – April 25, 1969 Part VII

John P. Collett, President of Collett and Company, Inc., Director of D-A from 1940-1954 and since 1960 reminisces:

My initial contact with D-A Lubricant Company, Inc., and Frank L. Binford, President of the Company until his death on November 16, 1954, was 30 years ago in 1939 when I was employed to appraise the D-A Lubricant common stock and the Burnett-Binford Lumber Company common stock in the estate of Mary Q. Burnett, who died on September 4, 1938.

I was impressed with the operations and the strength of D-A Lubricant Co., and with the management qualities of its president. The stock of D-A was very closely held, with absolute control held by Frank Binford. I told Frank that if any stock became available, I would like to buy some. I well remember his reaction: "Why in the world would you want to buy stock in this little company?" This kind of challenge I understood when I knew him better. Shortly thereafter, some stock became available, and on September 30, 1939, I purchased stock for myself and for other members of my family. Collett & Company, Inc. prepared a circular on the common stock of D-A Lubricant Co, Inc. early in 1940 and at that time, sold some stock to others from the account of Frank Binford.

On January 25, 1934 the company had been reorganized under the Indiana General Corporation Act of 1929, and a 900% stock dividend paid on the 350 shares outstanding. The capitalization of the company then consisted of 3,500 shares of common stock of \$100 par value. The stock was split 10 for 1 in 1956 and there are now 35,000 shares \$10 par value outstanding.

While the earnings were meager for the first few years, beginning in 1929 and continuing over the past 40 years, they have been impressive. D-A Lubricant started paying dividends on its common stock in 1928, with the payment of \$10 per share, and dividends have been paid in every year since, in representative amounts.

Frank Binford was one of the best businessmen with whom it has ever been my pleasure to be associated. He was tough minded and constantly challenged even his own judgment, which was excellent. He was conservative in his outlook, and I used to tell him that he kept one foot on the accelerator, and one foot on the brake. He would say: "It looks as though we will have a good year, but if business drops off, we can liquidate." The circular shows a statement of the company as of December 31, 1939, and it reflects his conservatism. Cash and marketable securities, which he always kept in a good-sized amount as a reserve, were 4 ½ times current liabilities, and the current ratio was 16 to 1.

Frank had the courage to act contrary to public opinion. If he thought the stock market was too high, and business might decline, he would sell all of his common stocks at a time when enthusiasm for common stocks was at its height and no clouds were on the horizon. He was a gentle, but independent person with the courage of his convictions. Over a period of years, he "fired" several top operating officers in the company who worked closely with him because he felt it was necessary and therefore his duty.

Frank had a good sense of humor, and was a devotee of sports. Until a severe heart attack, he was an excellent golf player, and for many years played every day. He was a real baseball fan. He and his good friend Edward F. "Doc" Smith, a bridge contractor who was a director of D-A, and I attended many baseball games together. We all enjoyed being grandstand managers of the Indianapolis Indians, and none was more critical or vocal than Frank.

I have been a director of D-A for two periods; first from January 1940 to May 1954, and the second, from April 1961 to present. It's been an interesting and profitable experience for me, and no small part of this is attributable to Tom Binford, who took over as head of the company upon his father's death in 1954. Although different, Tom, in many ways, is his father's son.

Number 1642 – May 23, 1969 Part VIII

In the May issue of Greater Indianapolis magazine appears a feature story entitled *History of 50-Year-Old Firm Tied Closely with Racing*. The story is lengthy so we are reprinting only that portion which applies to D-A and Racing.

In its 50-year history in the city of Indianapolis, D-A Lubricant Company has seared its signature into the history books of both automotive racing and heavy-duty industrial machinery, but racing undoubtedly provides the keystone for the company's fame in the public's eye.

D-A's familiar yellow-and-black oval trademark is instantly recognized by racing fans throughout the world. Most people think D-A has been around racetracks since racing began, but that's not true. D-A has been associated with the Indianapolis Motor Speedway and auto racing only since the early 1950's.

"Actually D-A products were privately used by some racing drivers in the 1930's but there was no organized program of development by D-A at that time," says Thomas W. Binford, the 45 year old president of the company.

He explains that D-A became involved in racing for two reasons: a recognition that racing provided an excellent "field laboratory" for the development of superior, high performance lubricants and a recognition that racing success offered tremendous promotional opportunities. D-A's sponsorship of championship racing cars grew out of these ideas, and by 1955 the firm was ready for its first full scale venture into the racing world.

Driver Cal Niday placed his D-A sponsored race car on the outside of the third row in qualifications for the 1955 500-mile-race and was running third in the contest when he hit the wall only 29 laps from the checkered flag. The D-A Lubricant dirt car finished fifth that year in the AAA championship dirt racing standings.

In 1956, D-A was back again at the Speedway with a new roadster. Bob Sweikert, the driver who had captured the National Championship in 1955, piloted the car to a sixth place finish in the race, despite a flat tire that occurred while he was running in third spot. Following Sweikert's death in a sprint race at Salem, IN, Dick Rathmann, Jimmy Bryan and Johnny Thomson climbed into the cockpit to race under the D-A banner.

1957 was a good year for the D-A racing team Thomson finished 12th at the Speedway after leading the race at 125 miles and setting a new track record for the distance. Thomson continued driving the D-A championship car and dirt car to earn seventh spot in the final national championship ratings.

D-A's new car for the 1958 Indianapolis race was unfortunately eliminated in the first lap accident, but the car, in later races, compiled more championship points than any other car in the country. Johnny Thomson won races at Springfield, DuQuoin, Syracuse and Sacramento and notched three seconds, two thirds and a fourth place in other races.

D-A ended its active sponsorship of a Championship car after the 1958 racing season because D-A President Thomas W. Binford had been elected President of the United States Auto Club, and D-A wanted to avoid any possibility of a conflict of interest. Binford continued to hold the top USAC post until his voluntary retirement in 1969.

"D-A did not disappear from racing during the time," Binford says. "We created the D-A Mechanical Achievement Award in 1959 to salute the chief mechanic who

demonstrates the greatest skill, imagination and perseverance in preparing a car for the 500-mile race.” Since its creation, nine different chief mechanics have been honored.

Out of D-A’s racing experience grew the Racing Division of the D-A Lubricant Company, which was formed in 1958 for the purpose of marketing D-A Speed-Sport Oil and D-A Speed-Sport Gear Lube. These products had been especially developed for use in competition and other high performance applications and are distributed nationally.

Number 1647 – June 27, 1969 Part IX

(Reprinted from Weekly Letter dated December 3, 1940)

D-A Diesel Oil, One of the Few in Caterpillar’s New List of All-Purpose Type Lubricating Oils

Within the next few days, we will send you a list recently issued by the Caterpillar Tractor Company, listing the “Caterpillar Approved All-Purpose type Lubricating Oils.” This is a differentiation from the old list, as the “All-Purpose” Lubricating Oils conform to the latest requirements of the manufacturer and are non-corrosive.

As we have explained previously, this move on the part of the manufacturer has been expected for some time since they are now in production on some engines with increased R.P.M. and increased horsepower. In these engines particularly, it is desirable to use an “All-Purpose Type” oil, which has greater stability improved oxidation inhibitors, and the important non-corrosive feature. Thus, D-A Diesel Oil is one of ten products on this current list rather than one of some forty as on the old list. In this connection, as you can see by reading the list, one of the products is listed several times, so in reality, D-A Diesel Oil is one of two or three Approved “All-Purpose Type” lubricating oils.

Another point that you’ll be glad to know is that the manufacturer specifies that these “All-Purpose Type” oils can be used 120 hours between drainings, while the old type compounded oils are to be changed every 60 hours. This eliminates the “price” argument put up by some of our customers, now that the manufacturer advises the longer draining periods.

We knew that D-A Diesel Oil could be safely and effectively used for longer periods than 60 hours, but were hesitant to recommend it until the manufacturer did. This is due to the fact that the compound in D-A Diesel Oil is not quickly exhausted and will provide safe and effective protection against corrosive acids, sludge formations, gum and carbon deposits, and oil breakdown for considerably longer hours than other type products.

The term “All-Purpose” will unquestionably become more widely used in the future, as additional manufacturers recognize the superior performance that this type oil gives in their engines. We’re mighty proud to have D-A Diesel Oil included in the list, and also to know that it is, in many ways, superior to other products on the same list.

Number 1648 – July 4, 1969 Part X

The D-A Weekly Letter dated June 27, 1969, reprinting the front-page story taken from the D-A Weekly Letter dated December 3, 1940, the first D-A Diesel Oil. This was almost 30 years ago and we felt it would be an interesting part of the D-A history. It all came about this way.

The U.S. Government, as one of the largest oil customers in the world, took the lead in straightening out the confusion regarding the types of oils most suitable for use in

high-speed heavy-duty diesel engines. A solution to the problem was reached, whereby a central approval procedure was established. This was based on actual engine testing of the different brands of oils submitted. Upon successful completion of the test, the Army Ordinance Board certified the oils as meeting the requirements of a certain Military Specification. The first heavy-duty motor oils were approved in this way early in 1940 and were known as 2-104 B oils. This approval specification was used until about 1946. By this time, there was a growing unrest among engine manufacturers that the 2-104 B test requirements were not rigid enough to guarantee good engine life under severe operating conditions. The testing procedure was stiffened somewhat soon after the war, and the new approval was certified under U. S. Military Spec MIL-L-2104-A (commonly called Mil oils). D-A Diesel Oil was immediately upgraded to meet these new requirements.

The ink was hardly dry on the lists announcing the new MIL oils, when a new service problem cropped up, in the nature of sulfur in the diesel fuel. This has always been present to a certain extent in crude oils, but prior to the post war boom, the refiners had been in a position to be selective about their domestic fuel production. Now they were forced to tap new fields, sometimes utilizing crudes from the Middle East and the sulfur content rose sharply and uncontrollably.

To illustrate the harmful effects that high sulfur fuel can cause in a diesel, picture for yourself what one pound of raw sulfuric acid would do in a combustion chamber of 1,000 plus degrees Fahrenheit. This is exactly the amount of acid created in 100 hours of operation if diesel fuel with 1% sulfur content is used. The only practical solution to this problem was to increase the alkalinity of the crankcase oils in order that they would counteract or neutralize the formation of acids around the rings and liners. This led to the existence of another approved oil list, officially classified as meeting the requirements of Mil Spec MIL-L-2104A, Supplement List #1 Oils. These are called Sup. #1 Oils, (sometimes Series 1 Oils) and our D-A Diesel Oil was upgraded to meet these new requirements in 1947. At the time this new approval was established, it was thought that sulfur content in fuels would rarely exceed .5 of 1%, so the Sup. #1 oils were designed to neutralize only 1% sulfur.

Number 1649 – July 18, 1969 Part XI

The D-A Weekly Letter dated July 4, 1969, discussed the problems in engine lubrication that led to the development of D-A Diesel Oil Series 1 as we know it today. Wonderful as D-A Diesel Oil was (and still is) it did not prove to be a complete answer to the problem.

It was soon discovered that the sulfur content in post World War II fuels was higher and more prevalent than had been expected. Also, a horsepower race was developing in the heavy equipment field, and a new series of high-speed diesels had recently been introduced. These often turned up 1,800 to 2,200 RPM's (800-1,200 formerly) and a supercharger was added to increase the air-fuel mixture to produce the necessary power.

As more fuel was being forced into the combustion chambers in a shorter time interval, this highlighted the sulfur problem even more, and resulted in the creation of a new approval around 1951 under the name of Superior Lubricants (Series 2). These oils were required to have enough alkalinity to neutralize 2% sulfur and were recommended for use in all pressure aspirated (supercharged or turbocharged) engines, or in any engine

which was required to burn fuel with a sulfur content of .5% or more. Unfortunately, the test engine procedure did not use a high sulfur fuel, and field service demonstrated that Series 2 Oils were not handling the combustion chamber deposits or acids.

As a result of these inadequacies, Series 2 was de-emphasized in late 1955, and the present test requirement was established to cover Superior Lubricants (Series 3).

The actual test conditions are as follows: a single cylinder bench test engine is used, the cylinder duplicating one from a supercharged Caterpillar D-337 engine with a 5 ¼" bore.

This engine is run under load for 480 hours using a 1% sulfur fuel. After dismantling the engine, if the top ring groove on the piston shows less than 80% filling, the oil is approved as a Superior Lubricant (Series 3).

D-A "Extra Treated" Diesel Oil meets and exceeds the Series 3 test requirement. In fact, we have completed the test with less than 5% ring groove filling, whereas; we could still call D-A Extra Treated Diesel Oil a Series 3 oil if we had as much as 75% ring groove filling.

D-A "Extra Treated" Diesel Oil has remained unsurpassed as the quality product in the Series 3 field ever since 1956. All Series 3 oils throughout the next 10 years contained additives of types and quantities that resulted in more than the 2% ash in the finished product. Around 1966, certain advances in high-speed engine design made this amount of ash undesirable in that it caused valve trouble and other problems in engine operation.

D-A had anticipated this development and had for some time been looking for additives that would produce the required results while producing substantially less ash in the engine. By late 1966, the ash content of D-A "Extra Treated" Diesel Oil had been reduced to less than 1.25% ash where it remains today.

This background on heavy duty engine oil developments and approvals may seem complicated, but it must be remembered that this brief history covers a period of almost 30 years of spectacular progress, both in engine development and oil development. The problems are not all solved yet. New engine designs are constantly being worked on and new developments in engine oils must be made to make the new engine designs practical. Far from resting on its laurels, D-A is working hard towards the next breakthrough in diesel engine oil development.

Number 1651 – July 25, 1969 Part XII

The horsepower race between engine builders that brought about the need for improvements in existing engine oils leading to the development of Series 1 and Series 3 oils also brought about the need for torque converters and automatic transmissions to handle the increased horsepower. Allison Division of General Motors brought out the first automatic transmission in the heavy equipment field and at their request; D-A developed its first Torque Fluid in 1955.

Allison's Torqmatic transmission had been in service a short time principally in large Euclid earthmovers, and the only automatic transmission fluid on the market was the automotive Type "A" that had been designed in 1939 for the original hydramatic used in Oldsmobiles. The primary need at that time was a fluid that was thin (- 35 degree pour), and contained "anti-squawk" additive to allow the hydramatic clutch bands to operate quietly and efficiently.

Our first problem was to provide a -35 degree pour that would remain stable at 300 degrees F operating conditions. This was accomplished by using a newly developed oxidation inhibitor in the same high viscosity index base oil that is used in the manufacture of our engine oils.

The next problem was to prevent the cracking or shrinking of rubber seals. This had always been a common problem, because whenever a rubber or neoprene (imitation rubber) seal was exposed to a mineral oil, this cracking or shrinking had existed. Again, a new type special seal preservative additive had just been perfected, and this was incorporated in our D-A Torque Fluid. This preservative creates a swelling of the rubber instead of shrinkage, but limits this action to maximum of .2 of 1%. The results from the field were highly satisfactory because leakage of the fluid had been both excessive and dangerous. We also added rust preventive additives, an anti-wear agent and a foam depressant. The finished product has been a huge success.

Allison set certain test requirements and established a list of approved oils, which they labeled "Automatic Transmission Type C". They endeavored to set the same high standards that were present in D-A Torque Fluid, but the large oil suppliers resisted. They argued that there was too small a consumption of such a product to warrant a special oil. Type "A" was all they would put out unless it was proven unsatisfactory for automobiles. A compromise was made whereby every other oil company in the country substituted a grade of oil that they already carried which could barely meet the Type C requirements except for the seal preservative.

D-A Torque Fluid was the only product designed especially for this application. Since it was first developed in 1955 as a type C Torque Fluid, D-A's product has been upgraded two different times, once in 1959 to meet the C-1 requirements and again in 1968 to meet the new C-2 requirements. During this engine period since 1955, D-A Torque Fluid had been and still is the leader in its field not only for use in torque converters but also for use in rotary compressors and hydraulic systems.

Editor's note: In the years since this history was written, many of the D-A traditions have remained. Over the course of several owners, D-A has never wavered from the commitment to offer the heavy-duty industry the most complete and superior quality products. Our extensive lab facilities and highly regarded research team make sure that D-A lubricants formulations are always responsive to (and ahead of) the changing market. In addition, we stay on top of government-required changes to various elements of diesel engine design that affect the lubricants used. The full line of D-A greases, oils, hydraulic fluids, gear oils and specialty lubricants still remain the top choice to extend fleet life and service hours. One other tradition we are proud of in this day of employees who stay a year or two before moving on, D-A has several employees who have been with the company 20, 30 even 40 years.