

GREEN
MAGAZINE
MARCH ■ 1998



A brief history of JD crawlers in the two cylinder era

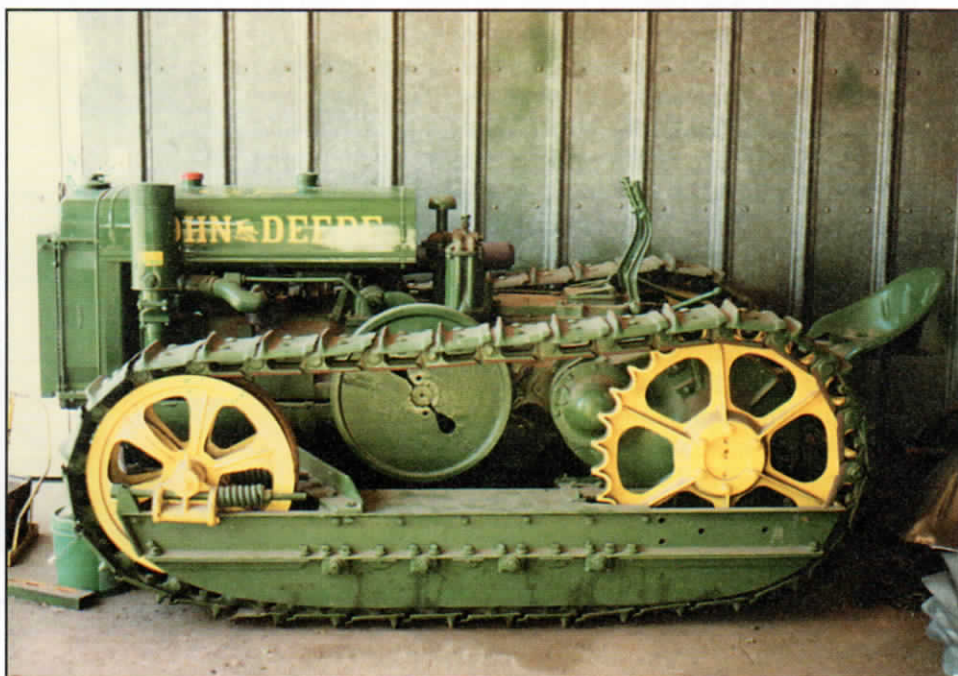
By J.R. Hobbs

While Benjamin Holt did not invent the crawler tractor, he was the first to make one that was successful and by the early 1900s, was producing crawler tractors that were quite technically advanced, compared to the behemoth wheel tractors of the era. The crawler system offered exceptional flotation and transmitted a very high percentage of engine power to the ground, enabling the crawler design to have great power without excess weight, a problem that plagued the early wheel tractors.

Since imitation is the sincerest form of flattery, it wasn't long before other tractor manufacturers began to look towards the crawler as a way to better harness the power of the internal combustion engine. Given the popularity of the tractor, the Waterloo Gasoline Engine Company of Waterloo, Iowa, after abortive experiments with tractors in the 1890s, was looking at reentering the tractor business in 1911. A man named Harry W. Leavitt, who had been in the tractor business from the beginning, was hired to design a tractor. Leavitt designed a tractor with a four cylinder engine, mounted crossways on the frame, that was evidently produced in VERY limited numbers, called the Waterloo Boy "One Man" tractor. It appears that in 1913, this tractor design was modified by removing the rear drive wheels and substituting crawler tracks. The result was named the Waterloo Boy "Sure Grip-Never Slip" or as it is sometimes known, the "Waterloo Caterpillar." Although no record exists, it is believed that only one or perhaps two of these tractors were built. Harry Leavitt left the company in late 1913 and that was the end of the Waterloo crawler tractor experiments. The experience



Above, Jesse Lindeman at the controls of a "BO" Lindeman crawler. Below, "GPO" Lindeman crawler owned by the Layhers of Wood River, Nebraska.



gained led the Waterloo concern to develop the famous Waterloo Boy tractors.

Fast forward to 1928. By this time, Deere and Company had been in the tractor business 10 years and the phenomenal success of the model "D" tractor had given both the company and the engineers the confidence to do some major experimental work on the "D" tractor. Although the 1928 "D" tractors had been given a larger engine, more horsepower and some reliability improvements, it was recognized that more improvements would have to be incorporated to keep the "D" competitive. Accordingly, in May 1928, a decision was published covering improvements for the "D" and specifying that these improvements were to be incorporated in a group of 100 experimental tractors to test the new features and improvements. From all reports, these "Exhibit A" experimental tractors proved to be quite successful, though modifications and improvements were in order.

With many of the features of the "Exhibit A" tractors slated for production in 1931, it was decided to once again build a group of 50 experimental tractors to provide manufacturing experience and final field tests for the changes to be made in the 1931 "D" tractors. Built in June and July of 1930 and known as the "Exhibit B" tractors, these machines were very close to the final form of the 1931 "D." However, this time, the engineers took the experimentation one step further, with 10 of the tractors being equipped with experimental crawler attachments. These tractors are the first evidence of any Deere experimentation with a crawler tractor.

These "Exhibit B" tractors were equipped with a half-track crawler attachment and retained the front wheels and steering system of the wheel tractors. It was anticipated that without a differential or track brake steering system, the tractors would be difficult to steer, at best, so to help in this regard, the tractors were equipped with very tall guide bands on the front wheels. Tested primarily in Montana, the



"BO" Lindeman crawler pulling mechanical sugar beet loader. Note pads on tracks. Black/white photos courtesy of Deere and Company.

crawler "Ds" pulled well, but were reported as nearly impossible to steer, with one user declaring "they might as well not have had front wheels!" It is believed that these tractors were either scrapped or later equipped with regular "D" wheel equipment and the Deere crawler experiment was abandoned.

However, Deere was not the only one experimenting with a "D" crawler. The Lindeman brothers of Yakima, Washington had also been conducting experiments with a "D." Prior to the Best/Holt merger that formed Caterpillar, the Lindemans had been dealers for the Best crawler tractors and missing the cut to become a Caterpillar dealer, had taken on the Cletrac line of crawlers. The Lindemans had also done some of the pioneering work on modifying the "GP" for orchard and grove work in 1929 and by 1930, were a full-line John Deere dealer. The Lindemans were impressed by the ruggedness of the "D" and its ability to burn the cheapest fuels and reasoned that a "D" crawler would sell well in the territory served by their dealership. The brothers had ample experience with crawler tractors and at approximately the same time that the "Ex-

hibit B" crawlers were laboring in the Montana hills, the Lindemans were busy fitting a set of Best "30" track assemblies to a "D." Equipped with track brakes, the Lindeman "D" conversion steered much better than the "Exhibit B" tractors, though steering performance left quite a bit to be desired. Eventually, three tractors were built and the Lindemans, though aware that changes needed to be made, contacted Deere about the "D" crawler conversion in 1932. The Lindemans were well known to Deere engineering by this time and a Lindeman "D" was shipped to the Deere Experimental Farm for tests in the spring of 1933.

The Lindeman machine, which had been constructed using "D" serial number 115052, was put through a rigorous testing procedure. It was noticed that the center of gravity needed to be moved forward, so a total of 480 pounds of weight was added to the front of the tractor to better balance the machine. So modified, the "D" crawler exhibited a drawbar pull exceeding a regular "D" by nearly 1,000 pounds, although when corrected for speed, the results were nearly equal. While performance was good, Deere felt that a "D" crawler



A 430 five roller crawler in industrial yellow paint, equipped with Auburn trencher, September 1958.

would be noncompetitive, both in performance and price, with most of the existing competition, namely the Cat 35, Cletrac 35 and the IHC T-40 TracTractor. However, Deere did not dismiss the potential of the crawler completely and advised the Lindemans that perhaps a crawler built on the "GPO" chassis might work a little better and be more price-competitive.

Apparently, the Lindemans took this advice to heart and began to work on a crawler conversion for the "GPO," though it appears that they also did some more work on a "D" crawler as there is a photo that exists showing one of the "Exhibit B" tractors equipped with a full crawler attachment. This machine looks very similar to what would become the "GPO" crawler and features what appears to be Lindeman-designed track, sprockets and undercarriage. It is thought that at least five and perhaps six "D" tractors were converted to crawlers by Lindeman, though whether any were sold is not known. None are known to exist today.

Based on the information that is available, approximately 25 "GPO"

tractors were converted to crawlers by Lindeman. The low-built design and final drive system of the "GPO" lend itself well to crawler service. Considering the economic climate of the time, it is a small wonder that even this many tractors were sold.

By 1935, the handwriting was on the wall for the "GP" series tractors. The introduction of the "A" and "B" tractors in 1934 had sounded the death knell for the "GP" and as soon as the standard tread versions of the "A" and "B" could be put into production, the "GP" series would be discontinued. The Lindemans were advised of this by Pat Murphy and Benjamin Keator of the Portland Sales Branch, who took a keen interest in the work of the Lindemans and unlike the Engineering Department in Waterloo, gave them encouragement and some help with their endeavors. It was Murphy and Keator that made sure the Lindemans got their hands on the tractor that would be the next chapter in the history of John Deere crawlers—the "BO" Lindeman.

Although it is clear that Deere did NOT design the "BO" with conversion to crawler service in mind,

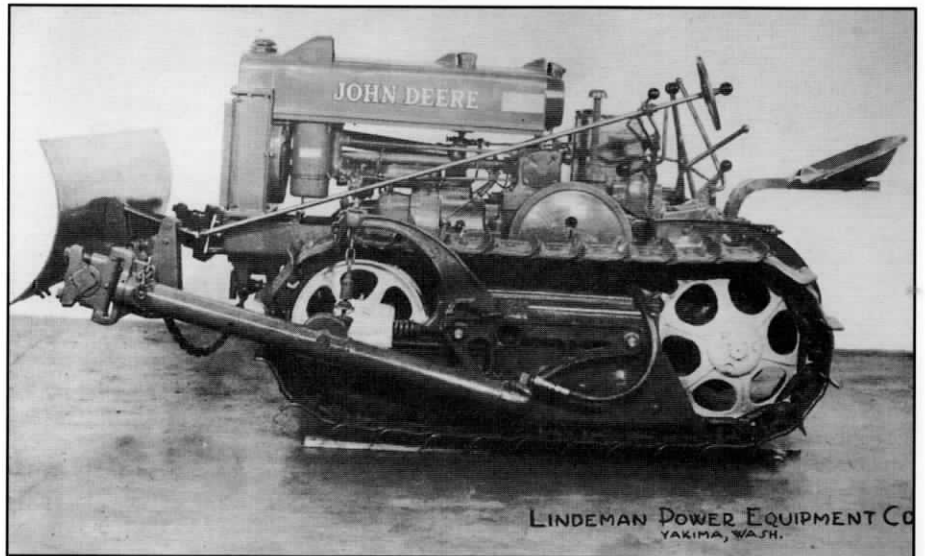
according to the late Jesse Lindeman, "we didn't have to even drill 10 holes in the tractor to mount the tracks and undercarriage!" However, it appears that experimentation with the "BO" crawler took some time, with only several prototypes produced in the 1936-39 time frame. One of these early tractors is known to exist and differs considerably from the "production" units that appear to have been first assembled in 1939. By this time, the details had been worked out and the "BO" had been given a larger and more powerful engine. Economic conditions had improved and there was a demand for the small crawler in the orchards of the Pacific Northwest, setting the stage for the first "production" John Deere crawler tractor.

Although production records no longer exist, it is believed that nearly 1,700 of the "BO" tractors were converted to crawler service. As the relationship between Deere and Lindeman became closer in the early 1940s, Deere began to ship ever increasing amounts of the "BO" tractors, specially packaged for Lindeman, to the Yakima concern. Overriding some of the professional jealousy between the Deere engineers and Lindeman, the Lindemans were also asked to build some "special" tractors by no less a personage than the CEO of Deere and Company, Charles Deere Wiman. Wiman, who was by then employed as a "dollar a year" man by the U.S. government, could see the potential of the "BO" crawler for military use and one "BI" chassis was sent to Lindeman for conversion. The "BO" was small enough and strong enough to be loaded and then dropped by parachute from an airplane. Although extensive tests were conducted by both the Army and Navy and appear to have been quite successful, Lindeman was not awarded the contract. However, the results of the tests convinced the government that the Lindeman-built crawlers were "essential to the war effort" and steel and other needed materials were allotted to both Deere and Lindeman so

that production could continue. Although production of the tractors had commenced on a regular basis in 1939, the majority of the "BO" Lindeman crawlers were produced between 1943 and 1946. Twenty-five tractors were built from "BR" chassis and there were many production variations of the crawlers. Due to the construction, wide gauge crawlers could be easily built if needed and at least two were built with "high crop" track assemblies for use in asparagus.

In 1946, two significant developments occurred. While the Lindemans had been busily producing "BO" crawlers during the war years, a group of Deere engineers had been pursuing the design of a new small tractor. These tests had been quite successful and by 1946, the design had been approved for production as soon as the new factory being built at Dubuque could be built, equipped and staffed. The new "M" was slated to not only replace the "L" and "LA" tractors but also to supplant the "BR"/"BO" and "H" tractors as well. While not quite as powerful, tests had shown that the "M" would compete very well and offered many advantages not offered by the "BR"/"BO" or the "H." Deere wanted to cancel the "BR"/"BO" and "H" tractors to free up production space to increase model "B" production and in late 1945, the decision was reached to cancel the "BR"/"BO" tractors as soon as the new "M" could be brought into production, thought at the time to be in late 1946 or early 1947.

By this time, Deere was also thinking about entering the crawler market. Although it appears that Deere had an unwritten "gentleman's agreement" with Caterpillar to stay out of the crawler market, due to the Deere/Caterpillar joint marketing agreements of the 1930s, it was becoming clear that this relationship was just not working out. Caterpillar, for its part, had not given the Deere industrial tractors much of a push and it also appeared to Deere that Caterpillar, which by the end of World War II was the dominant manufacturer of industrial crawlers and other industrial equipment, was



Studio photo of a "BO" Lindeman crawler equipped with optional hydraulic system and hydraulic toolbar with six foot dozer blade.

no longer interested in the agricultural market or in building small crawlers. The success of the "BO" Lindeman, whose sales had been confined largely to the Pacific Northwest, convinced Deere that a small, relatively inexpensive agricultural crawler could be a sales success. Not having either the time or experience to develop a crawler of its own, Deere turned to Lindeman. In early 1946, an experimental "M" tractor, "XM"-17, was shipped to Yakima, with instructions to "make a crawler out of it," which the Lindemans promptly did.

The "MC" prototype was field tested for John Deere officials in early December 1946. Although some bugs were evident, the "MC" competed very well with the "BO" crawler and the Deere people on hand, which included Deere president C.D. Wiman, were impressed, not only with the performance of the "MC," but with the engineering ability of Jesse Lindeman. Wiman was so impressed that he proposed that Deere should acquire the Lindeman plant. Although the plant was well worth the money Deere proposed to spend, the real plum was Jesse Lindeman himself and Deere promised to sweeten the deal with an additional half-million dollars if Jesse would stay on. Negotiations went quickly and on December 13, 1946, it was announced that Deere would buy

Lindeman and take possession of the plant on January 1, 1947.

With Deere now furnishing the money, development of the new "MC" was accelerated, with design work being done both in Yakima and Dubuque. Testing was conducted in Yakima, Dubuque and the Deere Experimental Farm in Laredo, Texas. Production of the new "M" tractor was delayed until March 1947, due to delays in receiving tooling and training personnel, but as soon as the new "M" was on line, plans were made for the production of the "MC." Testing and refinement continued through 1947 and 1948, with the first production "MC" being produced on December 28, 1948. Production of the "MC" was taken on by both Dubuque and Yakima. Yakima built the track and undercarriage assemblies for all of the "MC" tractors, with the basic "MC" chassis being built in Dubuque. Tracks and other parts for the "MC" were shipped to Dubuque for tractors to be sold in areas east of the Rocky Mountains. Dubuque shipped "MC" chassis to Yakima for final assembly to take care of the western states, which evened out the shipping costs.

The new "MC" proved to be a very popular tractor, not only in the agricultural role for which it was designed but in other applications not initially anticipated. The built-in



Studio photo of a Phase II 420 crawler, equipped with four roller track frame, single hydraulic system and direction reverser (tall lever next to hood. Note tracks are green.

“live” hydraulic system made the “MC” a candidate for all sorts of add-on equipment and it wasn’t long before the “MC” and the Lindeman-designed “MC-1000” tool carrier, which could be equipped with a bulldozer attachment, became a popular item among small logging operations as well. Compact, maneuverable and much cheaper than a Cat to purchase, operate or fix, the “MC” found a home in all sorts of nonagricultural applications. With the postwar housing boom well underway, the “MC” also found a niche with small and not-so-small contractors as a versatile earth-moving machine. Sales of the “MC” surpassed all expectations, with over 10,500 of them sold in just 3-1/2 years of production.

Though the “MC” was very popular, it was not without fault. Reports coming in from the field indicated that many purchasers felt that the three roller track configuration needed to be changed to a four or five roller design to further increase flotation. Track life was also a concern and better adjustment was needed. More power would also help. The

Dubuque engineers, with help from Yakima, had been working on this and experimental four and five roller “MC” crawlers were soon under test. In 1950, work had begun on a new series of “improved” Dubuque tractors, to be introduced in late 1952, featuring more power, new styling and a host of other improvements. As originally conceived, the new tractors would still be the “M” series tractors (“MCA,” for example) but a decision in late 1952 to abandon the “letter” series designations meant that the new tractors from Dubuque would be called the 40 series.

The new 40 crawler was introduced in November 1952. Although boasting 15 percent more power than the “MC” it replaced, the new 40C retained the three roller Lindeman-designed track. It had been intended for the 40C to be available from the start with four and five roller tracks, but shortages of the tooling necessary to build the new track necessitated the continuation of the three roller design. Although initial 40C production was done at both Dubuque and Yakima, high shipping costs were

quickly making this arrangement an uneconomical proposition. As soon as the necessary tooling to produce four and five roller tracks had been obtained, it was installed at the Dubuque Tractor Works and the Yakima plant was shut down in early 1954. 40C, serial number 62263, was the last 40C built with the three roller track. Beginning with number 62264, a Dubuque designed and built four roller track became regular equipment, with a five roller track optionally available. New track sizes and a variety of track pad designs also became available with the new track system.

The revised 40C sold very well and it began to dawn on Deere that many of the 40Cs were not being sold for agricultural purposes. Consequently, grille guards and other protection packages became available and Deere began to investigate, test and approve for sale attachments and equipment designed by short-line manufacturers for the 40C. Industrial yellow paint jobs in lieu of the standard green and yellow became available at no extra charge. In all, 11,689 of the 40Cs were sold in just under three years of production.

Successful as the 40 series crawlers had been, there was room for improvement. Customers wanted more power, more options and more equipment and in November 1955, the new 420 crawlers were unveiled. Although looking very much like the 40Cs that had preceded them, the changes to the 420s were mostly hidden under the hood. A new engine with 113 cubic inches and improved breathing offered over 15 percent more power. Final drives were strengthened and the hydraulic system was improved. A new option for the crawlers was a direction reverser, which offered forward and reverse speeds in any gear just by stepping on the clutch and pulling a lever.

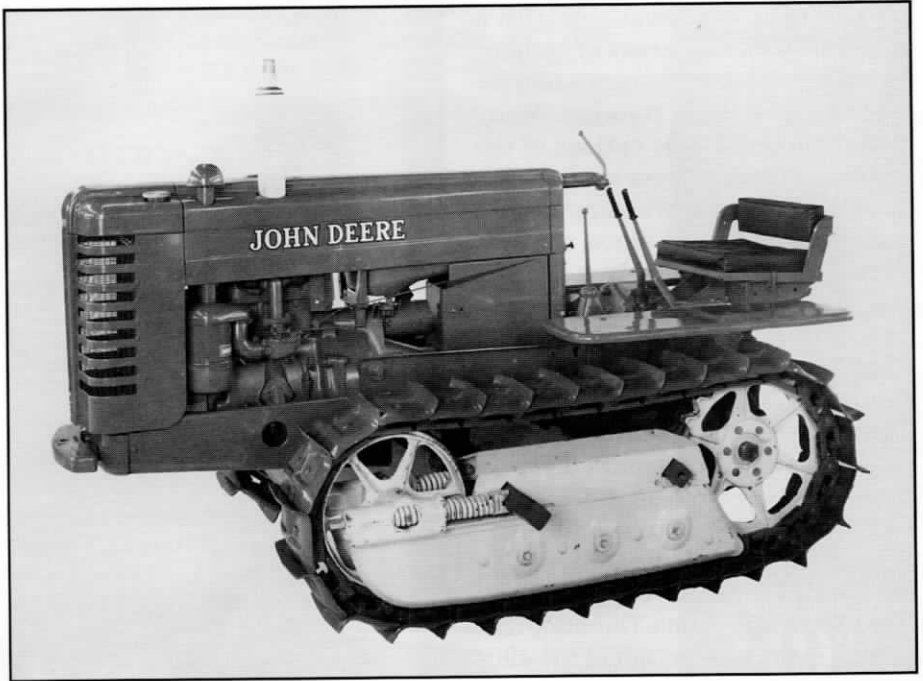
With more power available, sales of the new 420C really took off and in the first year of production, 5,386 of the 420Cs were sold, making the 420C the sales leader of the 420 “fleet.” For 1957, even more improve-

ments became available. The "Phase II" 420s offered a new, attractive two-tone paint scheme, but more importantly, a new five speed transmission became optionally available. Combined with the direction reverser, the 3.83 mph in fourth gear was particularly useful in loader operations. Another new option offered for 1957 was a three-point hitch, making the 420C even more versatile. With these new options, sales reached a new high with 9,498 420Cs leaving the Dubuque factory in 1957.

For 1958, changes to the well-proven 420C were minimal with revised and stronger transmissions being the only significant change. LP-gas engines became available, but only four of these tractors were sold. 1958 sales of the 420C were only 2,998 units, which would seem like the bloom had come off the rosy sales picture of only a year before. The 420C remained the rugged little crawler tractor it had always been, but the sales drop had nothing to do with a problem with the tractor or the competition for that matter. Industrial sales of the 420 had been so good that a decision had been reached to form the Industrial Division—and to produce a small crawler tractor specially tailored for industry.

The input from industrial customers who had bought the 40C and 420C tractors was nearly unanimous. They liked the power, the size and both the first cost and economy of operation, but the tractors did have some weak areas that needed to be addressed. Broken and cracked final drives were beginning to become an all too common occurrence. The sheet metal hoods and grilles were altogether too light to stand the hard knocks of industrial service. Operator comfort needed to be improved. Obviously, a new tractor was needed.

Given the sales success of the Deere line of crawlers, making the decision to produce a new line of crawlers and tractors was not a difficult one for Deere to make. This was seen as a low-cost way to get deeper into the industrial equipment business. The new tractors could be based



Studio photo of "MC," serial number 10002, taken Jan. 4, 1949. "MC" decal not applied.

on the proven mechanicals of the 20 series crawlers, beefed up in certain areas, with a minimum of cost. Upper management in Moline was enthusiastic and quickly gave Dubuque the green light to proceed.

On January 2, 1958, the first 440 crawler saw the light of day. The new 440 line boasted greatly strengthened final drive housings, which also incorporated mounting bosses for integral equipment such as backhoes, winches and the like. New Henry Dreyfuss styling gave the tractors a modern and aggressive look. Combined with a hood made of 1/8 inch sheet steel and a massive cast iron grille, the new tractors were much more rugged than their agricultural cousins. The crankcase breather, radiator and fuel filler caps were moved under the hood, with doors provided for servicing. The air cleaner was moved to a location behind the engine, with its breather stack placed on the right rear corner of the hood, out of harm's way. A five roller track frame was provided as standard equipment and a single-point track adjuster was regular, with a hydraulic adjuster optional. A new slanted instrument panel placed the controls

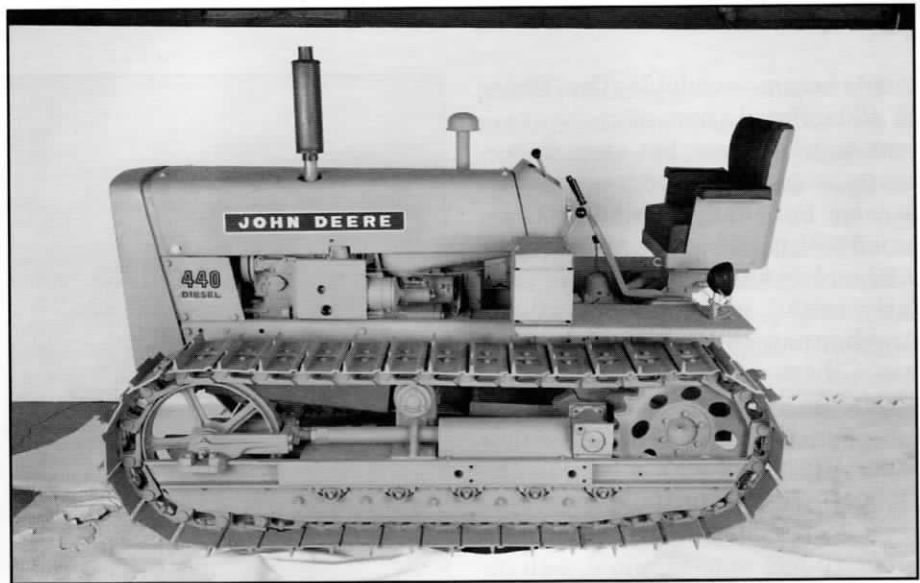
and gauges in easy sight of the operator. A new heavy-duty clutch-type direction reverser was adopted and a new T10474T engine block was furnished on the 440s. All of the options of the 420C were also available on the 440, with the exception of the LP-gas engine. Surprisingly, the all-fuel engine option WAS available, though why anybody would have wanted one or why Deere would have gone to the trouble of building it, since new parts had to be designed for the 440 to accommodate the starting tank, is a matter perhaps left to conjecture. Only 10 of the 440 crawlers were built with an all-fuel engine. Standard paint was industrial yellow, but other colors, even green and yellow, could be obtained on special order. The new 440s sold well, considering that 1958 was a year of economic recession. In all, 4,793 of the new 440 ICs (industrial crawler) were sold in the first year of production.

Meanwhile, over on the agricultural side, the 420Cs were transmogrified into the 430C in the fall of 1958. The 430Cs shared the new styling of the 30 series agricultural line and took some styling clues from their industrial cousins. As with the 420s,

the new 430s were available with a nearly bewildering array of options, including a special transmission for use with an Auburn trencher. Many of the industrial type options of the 440 series tractors were available on the 430s. Deere wasn't going to miss a possible sale and since the two tractors were very closely related, it was done very easily. But the 440 was making major inroads, as only 2,240 of the 430Cs were built from August 1958 until February 1960, when production was canceled.

Although customers by and large were well pleased with the 440IC, there was one consistent complaint that needed to be addressed—the lack of a diesel engine. Thus, Deere faced a dilemma. Dubuque had tried to make a diesel out of the 420-style engine, but test engines suffered catastrophic crankshaft failure. To make a diesel out of the existing Dubuque engine would be an expensive and time-consuming proposition—with no guarantee of success within the time frame needed. Work on the engines that would power the New Generation was well along, but even if a diesel engine had been ready for production in early 1959 (they weren't), Deere wasn't about to tip its hand on the top-secret New Generation project by building a four cylinder 440 diesel. Deere not only needed a diesel engine, it very much wanted to test the market not only in the industrial sector, but the ag sector as well. Since secrecy was essential, it became clear that Deere's only choice would be to buy a power plant from an outside source. Two engines were tested, a three cylinder Perkins and the 2-53 General Motors Detroit Diesel. Given the mind-set of Deere at the time, it is no wonder that the 2-53 got the nod. The necessary modifications to the 440 was performed, test units were built and since the GM engine was a well-proven design, development took very little time.

On January 6, 1959, the first 440 ICD, number 448086, rolled down the production line, the first of 6,679 tractors that would be built in only 15 months of production. But Deere had



Studio photo of a 440 ICD, equipped with 2-53 GM diesel engine, taken December 1958. This is probably a pre-production prototype.

not stopped there. 440C buyers who preferred gasoline engines got a more powerful version of the Dubuque engine. A larger carburetor, revised cylinder head and more RPM (2000 vs 1850) raised the rating of the 440 IC to 32 engine horsepower. Many other changes, mostly minor detail improvements, were made in the Phase II 440 tractors, beginning with number 448001. The Dubuque engineers had one more trick up their sleeve—the Pilot-Touch single stick control. Gone were the steering levers and the lever for the direction reverser. Hydraulics would now do it all. In operation, the system would automatically disengage the clutch, apply the brakes, shift the reverse, release the brake, engage both engine and steering clutches and away you went, in the opposite direction. Steering was done by moving the Pilot-Touch lever in the direction you wanted to go. This was a great new system, which left a hand free to operate loader controls, etc. Introduced in November 1959, the system was an instant hit with operators and in only four short months of production, 1,410 model 440 IC and ICD crawlers were built with the new system. Operators loved it—when it worked—which, unfortunately, wasn't often.

According to a retired Dubuque engineer who worked with the sys-

tem: "It should have worked and it would have worked and worked well, but we didn't have the money or machines to built it right. This was supposed to be something that would have been introduced on the 1010C, but someone got in a hurry and it just got put out too soon, without enough test or manufacturing time." Eventually, after unsuccessful modifications, combined with much wailing and gnashing of teeth, the Pilot-Touch system was abandoned and all but a handful of 440s so equipped were converted to conventional controls.

A new day was dawning at Deere. A project first conceived in 1953 was rapidly coming to fruition, after seven years and millions of dollars and man-hours. In February 1960, the last 30 series agricultural tractors and crawlers were built and the assembly lines were shut down to prepare for the New Generation tractors. But, given the popularity of the 40 series industrial line, the 440 crawlers kept rolling down the line until March 31, 1960, when number 463929, a 440 IC equipped, fittingly, with a Dubuque-built and designed two cylinder engine, clanked off the production line and into history. Over 60,000 crawler type tractors had left the assembly lines of Yakima and Dubuque, and had literally helped to shape postwar America. An era was over and a new era would soon begin.