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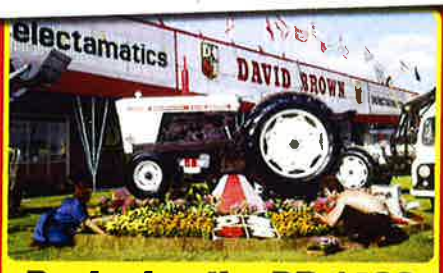

Designing the DB 1200

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LOADALL LINEAGE

The JCB Loadall turns 40 this year. What better way to celebrate this milestone than comparing a 1979 JCB Loadall 520 and a 1981 JCB Loadall 520-4 that Julian Carder has just finished refurbishing for collector Guy Nicholls in Suffolk with one of the latest JCB Loadall AgriPro models. Simon Henley looks at what's changed over the years.

THIS OCTOBER THE JCB Loadall, the world's most successful telehandler, will celebrate its 40th anniversary. Development work on the Loadall actually began at JCB in 1973 and would lead to the creation of a machine that, along with a handful of others, would transform the world of materials handling forever, not only within the construction and industrial industry, but also in agriculture.

The original Loadall 520 was a rear-wheel steer, two-wheel drive rough terrain machine, capable of lifting 2.25t to a maximum lift height of 6.4m. Its performance literally extended way beyond the capabilities of conventional rough terrain forklifts built at the time, yet the JCB Loadall wasn't actually the first machine of its kind.

Britain's first telehandler was called the Liner Giraffe. The Perkins-powered Giraffe, built by Liner Limited based at Gateshead in Tyne & Wear, was described by its manufacturer as a 'telescopic boom materials handler' or 'site placing vehicle' and was introduced in 1974 at the Public Works Exhibition in London.

Before the end of the decade the Liner would be joined by several other similar machines, including the Sanderson Teleporter and Sambron JackLift. Yet in the long term, none of these machines would have the impact of the JCB Loadall, which made its debut in 1977.

During the first full year of production, barely 300 Loadalls were produced by JCB. Back then, this was a niche market and the team responsible for assembling the Loadalls at Rocester consisted of only a handful of hand-picked employees.

Fast forward to today and over 800 people are employed building Loadalls, production of which recently topped the 210,000 mark. The Loadall range has grown to include 30 different models, from compact machines up to those with a maximum reach height of 20m.

To celebrate the enduring success of the Loadall, CLASSIC TRACTOR, with the help of our friends

Above: Guy Nicholls' recently refurbished 1979 JCB Loadall 520, right, and 1981 JCB Loadall 520-4, left, telehandlers are joined by their modern-day successor, a 536-60 Loadall AgriPro.

Inset: When he's not working for JCB as its Product Marketing Manager for Large Excavators, marque enthusiast Julian Carder spends much of his spare time restoring classic JCB equipment at his workshop in Uttoxeter.

at JCB, recently managed to bring together two superbly restored early machines with a flagship Loadall AgriPro.

The man behind the refurbishment of the two classic machines is Julian Carder. When he's not working for JCB as the company's Product Marketing Manager for Heavy Products Julian enjoys restoring classic JCB equipment in his workshop at Uttoxeter. He has spent 13 years with the company and if you cut him he would literally bleed JCB yellow paint. As well as a host of JCB refurbishments, his other credits include writing a Haynes manual on the JCB 3C MkIII backhoe loader.

The subjects of Julian's most recent restoration work are a highly authentic Loadall 520, built in 1979 and an equally resplendent Loadall 520-4 from 1981. The machines were refurbished at the request of their owner, Guy Nicholls, the former owner of Fork Rent, a plant hire company based in Ipswich. Fork Rent, which Guy sold in 2015, operated a fleet of 2750 telehandlers and was JCB's largest customer for Loadall machines.

"Both of the Loadalls are part of Mr Nicholls' private collection," explains Julian." I was commissioned to restore them about two years ago. Before I started working on them, it took me about 12 months to locate the necessary parts to restore them, many of which were still available from JCB. There was a tremendous amount of research, which involved a lot of searching through endless part numbers. However, when we eventually started to work on them, everything we needed was in stock."

The Loadall 520 that Julian has refurbished is a late-model MkI version from the period 1977-1979. It is powered by a 72hp Leyland 4/98 four-cylinder engine and is equipped with a Brockhouse four-speed powershift torque converter transmission and an electronic forward/reverse shuttle system. Tipping the scales at 6.5t (unladen), the Loadall 520 has a JCB front drive axle with oil-immersed, multi-disc front brakes, full-flow hydrostatic rear axle steering and a top speed of just 15mph.

"The 520 was the most difficult machine to restore," says Julian. "It was completely covered in a thick layer of oil when it arrived. Fortunately, the engine was in excellent condition and only required a new water pump, hoses, an alternator, starter motor and a full service.

"Everything was taken apart," he adds. "The hydraulic cylinders, the hydraulic pump, and the hydraulic valve block were sent away to be rebuilt. In fact, virtually every nut, bolt, fitting, hose and connector was replaced during the rebuild process.

"Once everything was apart, we started working on the sheet metal and soon found that the cab was essentially beyond repair. We had the original JCB cab drawings, so we sent them away with the old cab and had a brand new cab made to the OEM specifications. Many of the panels were also re-manufactured, in addition to parts like the front light boxes."

One of the many challenges that Julian faced was the refurbishment of the original radiator. This was completely blocked with oil and after endless hours of careful cleaning it was sent away to be acid-dipped and rebuilt.

LOADALL 520

YEAR: 1979 **POWER:** 72hp **LIFT CAPACITY:** 2250kg **REACH:** 6.4m

LOADALL 520-4

YEAR: 1981 **POWER:** 72hp **LIFT CAPACITY:** 2000kg **REACH:** 6.2m

LOADALL 536-60 AgriPro

YEAR: 2017 **POWER:** 145hp **LIFT CAPACITY:** 3600kg **REACH:** 6.2m

Early cab details

SLIDING DOOR

First generation Loadall 520 models had a cab with a sliding door. The cab on this machine is brand new and was built from scratch using the original JCB drawings.

CONSOLE

Instrument console in the 1979 JCB Loadall 520 was completely rebuilt during its refurbishment. Once repaired, the overhauled gauges were re-fitted and then labelled using the correct lettering font.

DECALS

Cab decals in the 1979 Loadall 520 were reproduced by the original supplier. The load charts were re-generated on a computer using photographs of the original items as a template.

The 1981 JCB Loadall 520-4, like the Loadall 525-4, is a four-wheel drive machine with rear-wheel steering. The two-wheel drive Loadall 520-2 utilised a JCB rear axle design borrowed from its backhoe loaders.

The electronic control unit for the Brockhouse gearbox also provided another challenge. While the transmission itself remained in serviceable condition, the control unit had been by-passed. To preserve the Loadall's originality, Julian decided to have the unit rebuilt by the original manufacturer. It took the company a considerable amount of time, but it was ultimately well worth it.

"The boom wear pads were another nightmare," notes Julian. "We couldn't find any OEM replacements so we had to have a new set nylon blocks made-up from scratch."

The Loadall 520's perspex roof window also posed a problem. Modern perspex is UV resilient, however, the perspex of 40 years ago was prone to discolouring and crazing. Making a new perspex panel involved sending the window to a specialist company so it could be used as a mould. The original part was coated with a chemical shield and then covered by thin layers of melted polycarbonate. Once set, the newly cast window, which was prevented from sticking to the old one by the chemical shield, was removed and the old one was discarded.

When it comes to refurbishing a JCB product, working at JCB obviously has its benefits. For example, the company which supplied the original foam for the cab interior is still one of JCB's suppliers. The supplier of the original in-cab decals also still produces decals for the company. But not everything could be obtained from JCB sources.

"The dash console in the cab had rusted away," notes Julian. "This had to be shot-blasted, filled, sanded and then painted. We then had to refit the gauges, which were refurbished, and then label them using the correct font for the lettering.

"The drawings for the original lift-charts inside the cab were no longer available," he adds. "Before we disassembled everything we made sure we photographed all the original decals. We then regenerated the design of them on a computer and had them professionally printed."

Anyone who has undertaken a refurb of this magnitude will be cognisant of the difficulties faced with sourcing items such as pieces of cab trim and OEM fasteners. For Julian, one of the hardest parts to source was the heel-plate ventilation cover located beneath the seat. The original had been broken following endless bouts of contact with drivers' boots. This part took months to source, with Julian eventually finding a new one in North America.

The JCB 520 Loadall entered production on 3 October 1977 and was the result of a development programme that began in 1973. Approximately 300 units were built by a very small team during the first year of production.

Another hard-to-source item was the steering wheel cap which covers the lock-nut. Julian was eventually able to locate two new items, one for each machine, through a social media website, in exchange for some OEM parts he had in stock.

"Attention to detail is everything," he explains. "On the Loadall 520, the original JCB nameplates were steel pressings which were welded on. To get the originals exactly right, the JCB lettering was hand-painted using an American black enamel paint. They were then bonded in place to avoid the rusting issues associated with welding them on."

Following the completion of the two-wheel drive Loadall 520 model in December 2016, Julian started work on the four-wheel drive JCB Loadall 520-4. This model was introduced in 1981 and was part of a new four-model range. Guy Nicholls' Loadall 520-4 is an early-production example of JCB's first four wheel drive Loadall.

The two-wheel drive version of the all-new Loadall 520 was designated 520-2, while the four-wheel drive was known as the 520-4. Both machines had a maximum lift capacity of 2t and a maximum reach of 5.74m. The new Loadall 520 models joined two larger models, the Loadall 525-2 and 525-4 with a lift of 2.5t and reach of 6.4m, which had been introduced the previous year.

The original 1977 JCB Loadall 520 was built like a battleship. With the new range, JCB's designers had carefully managed to trim the amount of steel that was needed, without compromising on the structural rigidity or strength of the machine. This not only made the 'new' Loadall 520 lighter but also more manoeuvrable. The MkII machines (note this designation was never actually used by JCB) were fitted with independent brakes and a four-wheel drive steering axle that allowed the 520-4 to turn in just 3.5m with one of its brakes applied.

Power was still derived from a 72hp Leyland 4/98 engine, but the Brockhouse gearbox was replaced by a JCB Powertrain four-speed torque converter hydraulic shuttle transmission, borrowed from JCB's 3C MkIII backhoe loaders. The JCB 3C MkIII backhoe loader's Max-Trac drive axle, equipped with a torque-proportioning differential, was also introduced throughout the Loadall range.

How they compare

MODEL:	JCB Loadall 520	JCB Loadall 520-4	JCB 536-60 AgriPro
YEAR:	1979	1981	2017
ENGINE:	Leyland 4/98	Leyland 4/98	JCB Ecomax Tier4F
POWER:	72hp	72hp	145hp
TRANSMISSION:	Brockhouse	JCB Powertrain	JCB DualTech VT
MAX LIFT CAPACITY:	2250kg	2000kg	3600kg
MAX LIFT HEIGHT:	6.4m	5.74m	6.2m
DRIVE/STEERING:	2WD/RWS	4WD/RWS	4WD/FWS or 4WS

Left: Second generation JCB Loadall models like this 520-4 had independent brakes and a transmission dump/inching pedal. The lever in the driver's left hand is the forward/reverse shuttle control.

The cab on the new model had also changed, with the revised control layout contributing to an improvement in the operational quality. The boom still used a four-lever operating system, but on the new MkII Loadall 520 model these levers were all now an equal length and were repositioned so they fell more easily to hand. The hydraulic response was also improved by 20 per cent.

On the previous Loadall 520 model, the dash console contained a melee of traditional gauges, whereas on the new improved model these were replaced by a single tractormeter and numerous warning lights. There was also a new safe workload system, with progressive visual signals and an audible warning when the load reached 95 per cent of the maximum capacity.

"The 520-4 was a much easier machine to restore," admits Julian. "We basically used the same format as we had for the previous project, the main differences with the 520-4 involving the restoration of the cab. On this project we were able to salvage the original cab structure. In fact, the cab was in really good condition and all the panes of glass, apart from one, are the originals."

Determined to conquer almost any challenge that faced them, Julian and his workshop colleague tackled several new problems with the Loadall 520-4. The most significant of these was the refurbishment of the hydraulic valve block.

"The company which originally manufactured the unit was no longer in business," says Julian. "We sent it to a specialist company to be rebuilt, but when it came back it was still leaking. To help them, we ended up researching the problem, which related to an internal leak, and instructed them on what could be done to repair it. When it came back the second time it was perfect."

The Loadall 520-4 has a particularly long exhaust system, which on Guy Nicholls' machine was severely corroded and required replacement. The problem was, only the engine silencer could be located. The remainder of the exhaust system had to be custom-made, all the way from the engine manifold right up to where it attaches to the silencer.

Opportunities to inspect a JCB Loadall 520 and a JCB 520-4 side by side, let alone machines in such

LOADALL 520

Original-spec Bostrom Saxon seat in the JCB Loadall 520 looks the part now it has been re-upholstered. A similar seat was also used on the company's 3C MkIII backhoe loader.

LOADALL 520-4

Cab on the second-generation Loadall 520 had a swing-out door which could be folded back and locked out of the way. The layout of the cab interior was improved too.

LOADALL 536-60 AGRIPRO

Cabs on the high-spec JCB Loadall AgriPro models benefit from an armrest-mounted joystick, an air seat, air-conditioning and an automotive-style control layout.

stunning condition as those refurbished by Julian and owned by Guy Nicholls, don't come along very often, if ever. What made this particular occasion even more special was the presence of a brand new JCB Loadall 536.60 AgriPro. Here, in celebration of the Loadall's 40th anniversary, were some of the first and most recent JCB telescopic machines.

Arguably the most significant feature of the new Loadall AgriPro is JCB's DualTech VT transmission, a design that combines a Bosch Rexroth hydrostatic unit with a JCB three-speed powershift module. The result is a transmission which provides purely hydrostatic drive up to 19kph, at which point the powershift system takes over, allowing the handler to achieve a maximum speed of 40kph.

Another benefit of the DualTech VT design is that it doesn't use a torque converter. The hydrostatic/powershift combination provides direct drive straight to the wheels.

This innovative transmission can also be operated using a setting called Fleximode, which allows the operator to set a constant engine speed, at which point the accelerator pedal becomes a proportional drive pedal, providing infinite speed control up to a programmable speed setting within the hydrostatic drive limit of 19kph.

Of course, the new AgriPro machine boasts many other modern features, including four-wheel steering, Smooth Ride Boom Suspension and Auto Bucket Control. It also features a single joystick with proportional hydraulic control and an integrated forward/reverse shuttle.

The well-proven Loadall design, when combined with the astonishing performance of the latest DualTech VT transmission, gives today's machine the same sort of superiority that its predecessor enjoyed over its rough-terrain forklift competitors 40 years ago. Yet if you strip away the modern design technology and electronic control systems of the latest 536-60 AgriPro, the original design concept of the first JCB Loadall 520 remains the same to this day. That fact alone really puts into perspective the achievements of the original Loadall design team all those years ago.

Above: JCB Q-Fit quick-attachment carriage system was introduced on the second generation of Loadall models introduced in 1980. It was designed for use with a range of attachments built by Moovmor and Strimech.

Above left: JCB's latest Loadall 536-60 AgriPro is equipped with the company's DualTech VT transmission which combines a Bosch Rexroth hydrostatic unit with a JCB three-speed powershift module.

Below: Paint scheme on the first generation JCB Loadall 520, left, was a mix of lemon-yellow, white and red, the same as that used by the 3C MkIII backhoe loader, also introduced in 1977. The later second-generation 520 switched to an all-yellow livery.

Acknowledgements

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