



New Holland

Built in Britain

For six decades, blue tractors have been built in Basildon at a plant that's evolved and undergone significant change to match the modern requirements of farming. CPM was invited to New Holland's 60th birthday tour.

By Martin Rickatson

When it comes to complex machines, modern manufacturing theory is focused on specialism rather than end-to-end construction of a product in one plant. Making tractors is no different.

Where once the machining of metal and construction of many major components took place under the same roof as final assembly, with potential consequences for contamination and reliability, today those processes are separated by dedicated specialist factories, with key machine elements shipped for assembly by experts.

This, says New Holland, has driven the development of its Basildon tractor plant in Essex, and it reckons the result is more reliable products of higher quality.

The plant was developed on a greenfield site in the early 1960s by Ford, working on a £10M budget that had been stretched at completion to double that

figure, numbers equivalent to £100M and £200M today.

Seeking to modernise the production processes at its existing car and tractor plant at nearby Dagenham, the company was encouraged to develop a dedicated tractor facility in the new town of Basildon.

Creating a new base

Work began on 2 April 1960 and was completed on 29 February 1964. The opening of the factory, with its distinctive 38m (125ft) 'onion' water tower and 414,528m² footprint on a 40ha (100ac) site, coincided with the launch of the 37-65hp Ford 6X tractor series made there. This comprised the 2000 Dexta, 3000 Super Dexta, 4000 Major and 5000 Super Major, later to be known generally as the 'Pre-Force' models following the 1968 launch of the 'Ford Force' 2/3/4/5000 tractors.

In the 1970s, the plant benefitted from £5M in new machinery and £7M spent on plant improvements.

Later significant product introductions would include the 7A1 '600 series' tractors in 1975, from the 2600 to the 7600, and the similar 7A2 versions with the new quiet Q-cab the following year. In 1981, these tractors were updated to Series 10 specification with later Force II (1986) and Generation III (1989) evolutions.

The first factory robots were installed in 1982 for engine flywheel ring gear installation, and in 1989 the plant produced its two millionth engine.

Late 1991 saw the launch of the all-new

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40 series, a range that would later be sold with new branding following Ford's earlier decision to exit the farm machinery business and sell its Ford New Holland arm to Fiat, which adopted 'New Holland' as its brand for the future.

As the decade progressed, Basildon factory investments continued under the new owners, with developments including the installation of a robotic paint floor to improve the painting process, and the introduction of automated guided vehicles (AGVs) for speedier and safer movement of components.

After 44 years and more than 3M units, in 2008 Basildon built its last engine and the plant was subsequently wholly devoted to tractor assembly. The business's management points out that this natural evolution of manufacturing matches the method of most other modern manufacturers across all sectors, bringing together components produced elsewhere

by expert teams for final assembly by specialists in each process, in an environment dedicated to the purpose.

As an example, engines now come from the Italian facilities of FPT Industrial which falls under the same overall ownership, axles and transmissions come from CNH Industrial's plant in Antwerp, and cabs hail from the firm's factory in Croix, France, although their design is led from Basildon.

Subsequently, the plant produced New Holland 60 series, TS, TM, T6000 and T7000 tractor lines, and now manufactures the T6 and T7 ranges, spanning 125-300hp.

Recent developments at Basildon include significant investment in its role as the New Holland Alternative Fuels Centre of Excellence. In 2006, the firm declared its ambition to be the 'Clean Energy Leader' in the tractor sector.

While elsewhere in the world it's developed a smaller Electric Power tractor based on its T4 series, in 2021 New Holland put into production the industry's first tractor of its type at Basildon — the T6.180 Methane Power LNG (liquefied natural gas), to be joined later this year by the T7.270 Methane Power CNG (compressed natural gas).

To meet the legislation in place for

producing gas-powered vehicles, a dedicated sub-assembly area was opened at Basildon when T6.180 Methane Power LNG production began in 2021, complemented in 2022 by a dedicated pre-delivery inspection building for methane-fuelled tractors.

Gradual uptake

While the price is around 25% greater than for a diesel equivalent, small numbers of T6.180 Methane Power LNG tractors are now at work on UK farms that have invested in the necessary infrastructure to achieve a longer-term reduction in fuelling costs as well as their greenhouse gas emissions, particularly where residual waste after methane collection is returned to the soil.

The business says these early adopters have tended to already be involved in biogas production and/or use, or have a significant end-customer demand for enhanced environmental credentials, and are doing high-hour workloads.

With the infrastructure to collect, process and store methane from AD plants and slurry stores now readily available, New Holland believes this will drive development of the market for its ▶



Transaxles from CNH's Antwerp factory provide the starting point of each tractor, mated to engines from Italy and cabs from France.



Cabs frames from the Croix plant in France are trimmed and finished at Basildon as part of tractor assembly.

Here's an idea

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T6 and T7 production requires more than 10,000 different product specifications to meet global requirements – 85% of production is exported.

► methane-powered tractors from farm businesses seeking ways to cut carbon footprints, reduce dependence on external fuel supplies and lower machine running costs.

Early last year, in order to extend its capabilities beyond gas-powered tractors into the infrastructure and equipment necessary to produce gas power, CNH Industrial purchased a majority stake in Bennamann, a UK-based firm focused on capturing methane for energy use.

CNH's relationship with the business goes back to 2019 when the parties jointly developed an LNG tank for the T6.180 Methane Power LNG, and CNH subsequently acquired a minority stake in the business.

Pilot farms are already using captured methane from livestock slurry, which is purified into biomethane that is subsequently either compressed (for CNG Methane Power tractors) or liquefied (for LNG models). Launched at Agritechnica 2023 to extend the Methane Power line, the new T7.270 Methane Power CNG's larger chassis helps maximise on-board gas storage, with capacity for 1,265 litres (219kg), or 178% more fuel than the T6.180 Methane Power LNG's 455 litres/79kg.

But conventionally-powered tractors look set to dominate production for some time yet as the market for non-fossil fuel powered machines is developed. Today, a complete tractor rolls off the Basildon assembly line every five minutes, with more than 10,000 different product specifications to meet global requirements — 85% of production is exported.

Just as it has for tractor customers, technology in the plant has made procedures faster and more efficient. With only 1.4 tractors a year having the same specification, no two machines made during annual production are identical.

To ensure this tailor-making is swift and

efficient, New Holland has adopted a 'smart factory' plant management system designed to ensure the correct parts reach each tractor at every point in the production process.

Smart factory

"We use a radio frequency identification (RFID) system, with individual tags for each of the 3500 individual part boxes in circulation around the plant at any one time," explains Ryan Hopkin, plant director, who came to the factory five years ago from the automotive sector.

"This 'smart is part of factory' technology integration began in 2020, resulting in the gradual installation of 40 digital workstations throughout the line that ensure precision management of both processes and parts, with full traceability so we can identify any issue.

"For example, in terms of cab roofs alone there are 27 different types across different models, markets and specifications. In 2023 we installed a new bonnet and cab roof manipulator, enhancing precision movement and installation of these components," adds Ryan.

"The same year, we also installed a new robotic painting plant and monolayer paint system which is among the most advanced across all CNH factories, to further enhance product protection and longevity. Further investments have included improvements to our electrical connection installation quality process."

Around 300 people work on the production line at any one time, at which point there'll be approximately 160 tractors at various stages of manufacture. The line has 2.2km of suspended monorail above it to support part-built cabs until the point they're married to the tractor unit itself, a highly-skilled manual process. Completion of a single tractor takes around 1.5 days, at which point it's towed off the end of the line for its pre-delivery inspection.

Basildon is also responsible for the engineering design of the T6 and T7 tractors it manufactures, which span 125-300hp with a team of 70 staff across multiple disciplines overseeing product development.

In 1987, the first computer-aided design systems were adopted, followed eight years later by the first 3D modelling technology. Since then software has evolved rapidly to include more advanced digital modelling tools and the ability to work with 3D printers, allowing rapid trialling of development concepts.



Sean Lennon believes there's a clear path for its automation development that won't necessarily see drivers disappear from arable farms.

Tom Kindred from the Basildon engineering and product development team, explains that the department works particularly closely with CNH's global development teams in Chicago, USA, and Modena, Italy, to benefit from the company's worldwide expertise and ensure the requirements of different markets are met.

"While many things have changed here technologically, we still maintain important facilities established in 1964 including our test track which retains an important role in testing and development to ensure quality and reliability of production machines ahead of launch.

"Wireless technology has replaced the traditional test truck full of data loggers attached via umbilical wiring to the tractor running alongside, and we can share data instantly with any of our global facilities," he says.

Tom says rolling road facilities allow the team to subject test tractors to stresses that can replicate in a few hundred hours an entire machine lifetime's workload, to ensure components and assembly processes are sufficiently strong. "But field testing is also important, and we have a farm in Suffolk where this takes place plus we work with farmers around the UK and the world to test developments for us.

"Having the product development team based here at the factory means we work closely with other company functions in addition to design and manufacturing. Working with product marketing we can respond to customer feedback, while co-ordinating with our service teams we can identify and rectify issues on the production line, and collaborating with our on-site training centre we can assist in



Attracting and retaining staff is central to successful product creation, which translates into customer satisfaction, suggests David Rapkins.

getting service engineers quickly up to speed on new developments.”

Beyond alternative power, automation is one of the key current topics in tractor development and Sean Lennon, New Holland vice president for Europe, believes there's a clear path for its development that won't necessarily see drivers disappear from arable farms.

Drive to automation

“For the family farms operating one or two tractors, automation doesn't necessarily present any advantages,” he acknowledges. “But on larger arable farms struggling to find good labour, automation is driven by this and by requirements for less-skilled operators to be able to do a better job at high workrates, and existing skilled operators to get the maximum from their machines. This is where we see the drivers of automation.

“I think it's first likely to be seen more commonly in ‘fixed’ crops such as vineyards and orchards which are already based on repeatability, and so are simpler to adapt to automation.”

Since its commercial vehicle activities were demerged in January 2022 as Iveco Group, leaving CNH Industrial as an agricultural and construction machinery specialist, New Holland's parent business now comprises 43 global factories and more than 40,000 full-time employees.

In Basildon, there's a focus on attracting the best factory and support staff and ensuring they understand agriculture and the influences on the tractor and machinery market, says David Rapkins, New Holland business director for the UK and Ireland, who oversees the business's relationship with its 32 UK dealers and their 103 branches.

“We're firmly focused on bringing in the next generation to our business in order to ensure continuity for our customers and often host students from schools and colleges to show them the opportunities in an industry that's full of technology and opportunity.

“We have a full apprenticeship programme to support our dealers and loan components and machines to colleges for training. We also have 20-30 placement students each year with backgrounds not just in agriculture and engineering, but many other disciplines, with many returning to permanent positions here,” he says.

“Attracting and retaining staff is central to successful product creation, something we believe translates to customer satisfaction.” ■



Harking back to the times of the Basildon plant's 1964 opening, New Holland unveiled a special T7.300 tractor in psychedelic livery.

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