

“You’re moving just enough soil to create a strong rooting zone.”

The ultimate aim is optimum tillage

Machinery Innovation Insight

Over the 15 years since the first prototype Claydon drill established crops in strip-tilled bands, the system has evolved beyond the kit itself. *CPM* examines the concept of Opti-Till.

By Tom Allen-Stevens

Growers going through the second generation of cutting cultivation costs are generally set a challenging dilemma: do you stick with, and perhaps tweak the min-till system, and accept the various compromises it brings in terms of weed control and cost, or do you brave the zero-till route with the substantial rewards it can bring, while it can also go horribly wrong?

Claydon has built its brand and its now multinational market around occupying the middle ground. “We call it Opti-Till,” explains Spencer Claydon. “You’re going directly into the stubble, but you’re moving just enough soil to create a strong rooting zone. This optimum tillage sits somewhere in between min till and zero till.”

Iconic drill

At the heart of this system lies the iconic Claydon Hybrid drill, originally developed back in 2002 by Suffolk farmer and innovator Jeff Claydon. Fed up with putting a vast number of cultivation passes through his tough clays to beat them into a seedbed, he developed a drill that cultivates and drills into a band. He wanted an even seed placement and emergence and to give the crop space for light and air. “You’re aiming for the ultimate growing environment,” he says.

“You do the optimum tillage to stimulate the seeding and rooting zones, bringing the right air/soil ratio and drainage. But the structure remains intact — in between the rooting zones is unmoved soil, which

means better moisture retention, so the right humidity for even emergence, more worm activity, and a better surface for travelling on.”

The concept has caught on with a growing number of arable farmers in over 30 countries — the company estimates around one million acres worldwide are now established each year using the Claydon system. But it’s also been honed and developed over the past 15 years, responding to challenges, adding options and mini-innovations. These, say the Claydons, ensure the system remains versatile and flexible to meet customers’ needs in different situations and cropping patterns.

“Opti-Till revolves around three distinct phases — stubble management, the drilling itself and consolidation afterwards,” explains Spencer Claydon. “Taking a step back, you have to start with the right rotation, and that includes spring cropping, as appropriate.”

The Claydon Straw Harrow is the key tool to use immediately following the combine. Travelling at speeds up to

Typical cultivation costs over 300ha

Operation	Min till		Operation	Claydon Opti-Till	
	Cost (/ha)	Total cost		Cost (/ha)	Total cost
3m deep tine, disc, packer	£40.25	£12,075	7.5m Straw Harrow (x3 passes)	£24.15	£7,245
4m shallow power harrow	£43.13	£12,939	4m Claydon Hybrid drill	£36.50	£10,950
4m disc drill	£36.63	£10,989	12.3m Roll	£11.13	£3,339
12.3m roll	£11.13	£3,339			
Total	£131.14	£39,342		£71.78	£21,534
Annual saving				£59.36	£17,808

Source: Claydon cost calculator — www.claydondrills.com/savings-calculator

25km/h, this moves the top 2-3cm of the soil surface, breaking up residues and spreading chopped straw and trash. “It’s best used at a 30° angle to the previous drill lines, and don’t lift up at the ends, or you end up with heaps of trash on the headland,” advises Jeff Claydon.

Volunteers and young grassweeds are also controlled, while it brings slug eggs to the surface, where they dry out, he claims.

“You want to make a pass every 7-10 days when there’s a tinge of green for best weed control — once it tillers a grassweed will transplant. Get it right and you should only have to make one application of glyphosate just before drilling.

While a straw harrow suffices on a clean stubble, more challenging conditions benefit from a pass with the Terrastar. This puts rotating star points into the

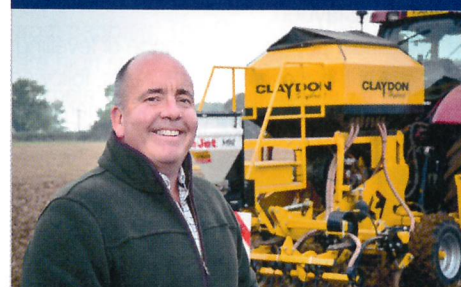


The Claydon Straw Harrow follows the combine to break up residues and spread chopped straw and trash.

soil surface, which are fitted in a 200mm grid pattern to two knife bars each side of the machine. These leave the soil structure intact but pluck up divots, providing a little extra tillth to subsequently work with the Straw Harrow.

“The Terrastar pulls you out of a less than ideal situation,” notes Jeff Claydon. ▶

Benefits grow as Claydon establishment system develops



Julian Lownds uses a Claydon Straw Harrow immediately after harvest, at an angle of up to 45° to the combine’s travel in front of his 3m Hybrid drill.

With grain prices falling and rents potentially increasing Julian Lownds looked for an alternative to traditional ploughing and min-till cultivations to reduce the cost of establishing his 120ha of arable crops in Dorset.

Growing hybrid oilseed rape, winter feed wheat and spring malting barley on a range of soils from heavy clay to chalk, he ordered a 3m Claydon Hybrid in 2015 and that autumn drilled all his own arable crops plus another 240ha of oilseed rape for other farmers in the area who were keen to assess the potential of the Claydon system.

“The Claydon drill reduced the cost of establishing crops to less than half that of min-till, so it substantially improved the economic sustainability of our business, as well as timeliness, soil structure and yields,”

says Julian Lownds.

The results led him to develop the system, purchasing a 7.5m Claydon Straw Harrow and a 6m Claydon TerraStar light rotary cultivator, both of which have proved invaluable for stubble management.

“When drilling OSR, the key is to bale the straw from the preceding crop immediately after the combine and get it off the field to minimise slugs,” he explains. “Because we drill OSR at a wide row spacing, the high humidity and reliable chit has allowed the seed rate to be reduced.

“The Straw Harrow is simple and effective in controlling volunteers and slugs, as well as being very fast and cheap to use, so it makes sense to make as many passes as time and conditions allow.”

So he makes two passes after harvest with the tines on the Straw Harrow set to the maximum angle so their action is as aggressive as possible. The tractor’s hydraulics are adjusted so the whole weight of the implement rests on the tines. “That creates about 25mm of tillth — normally enough to encourage weed seeds and volunteers to chit.”

The 6m TerraStar increases the seed-to-soil contact on heavier ground to, notes Julian Lownds. “It produces a little more tillth but not an excessive amount like a normal cultivator would. It also thoroughly mulches and incorporates any stubble and chopped straw, leaving a clean surface.” His TerraStar has been modified to

incorporate an air-seeder for one-pass establishment of grass, stubble turnips, cover crops and game cover.

“For anyone who has been used to ploughing or deep min-till cultivating the most difficult aspect of the Claydon System to grasp is the idea of seeing stubble after the next crop is in the ground, rather than a clean, brown seedbed. It can look a little untidy over winter, but a Claydon-drilled crop will have been established with much better timeliness and into ideal soil conditions,” he says.

“It takes a while to adjust to doing anything differently and get the best from it, but the Claydon System has already made a significant difference, both in economic terms and how we establish crops.”

The broadcast seeding unit on the 6m TerraStar allows one-pass establishment of grass, cover crops and stubble turnips — a service he now offers to other farmers.





Lying somewhere between min till and direct drilling, Opti-Till aims for the ultimate growing environment say Jeff (left) and Spencer Claydon.

► "It's useful where clay soils need that extra encouragement, where there's more residue to manage, or following OSR with high volunteer numbers, and in more challenging blackgrass situations. Use it straight behind the combine and then follow up 7-10 days later with

the Straw Harrow."

The aim with the stubble management, he adds, is to keep the soil structure intact with moisture and humidity in the surface to encourage weeds to chit and provide just enough tillth to manage residues. "The weed seeds are there in the soil, so make them grow and then kill them with frequent passes."

The same system works for spring drilling, he continues. "Repeat the passes into the autumn until it's too wet to travel, then apply a dose of glyphosate. Once you can travel in the spring, a pass with the Straw Harrow wakes up the soil, then another dose of glyphosate is best before drilling."

Rooting zone

The drill puts a leading tine in front of an A-share seeder followed by a levelling board and/or harrows. The leading tine creates the rooting-zone channel. "Generally, you'll go deeper for OSR and in later autumn to encourage drainage, to around 12-15cm. While for wheat, the leading tine would be set at around 5-10cm."

The A-share is set to the right depth by wheels mounted on the front of the rigid frame. Seed is applied into a 7, 15 or 18cm band, or the twin-tine option puts it either side of the disturbed channel at



The TerraStar puts rotating star points into the soil surface, which leave the soil structure intact but pluck up divots.

15cm spacing. Fertiliser can be placed below the seed via the leading tine, or above where the outlet boot is fitted behind the A-share.

"There's a minimum disturbance kit for drilling into cover crops, where the leading tine is replaced with a disc. It's worth noting you're relying on the cover crops to create the tilth, instead of the leading tine, and we don't think you get that every time unless you establish the cover crop using the leading tine," points out Spencer Claydon.

The most popular of the range of levelling options at the rear are batterboards, followed by harrows, but the Claydon drill generally

New Inter-Row Hoe targets resistant weeds in combinable crops

Claydon is set to launch an Inter-Row Hoe later this year to provide a method of controlling weeds in combinable crops band sown using the company's Hybrid drill. With a prototype developed over two seasons on the Claydon family's own farms, it's designed to enhance levels of weed control, especially where resistant blackgrass is proving a problem.

"Some herbicides are now becoming less reliable, less effective and much more expensive," notes operations director Oliver Claydon. "Some growers are spending £40/ha on a product for blackgrass that in some cases is only 50% effective, or even less where they have resistant weeds. With no new chemistry on the horizon it was important for us to develop a method to improve weed control. The potential loss of glyphosate is also of great concern and requires alternative methods to be developed."

Used widely in row crops such as sugar beet, inter-row hoeing isn't possible in cereals drilled in conventional 125mm rows. But band sowing at 300mm leaves a 14-15cm wide unseeded strip which can be mechanically hoed.

"Trials of the Claydon Inter-Row Hoe on our own farms, in conjunction with the use of herbicides, have proved that the unit will pay for itself quickly through reductions in grass weeds and improved crop yields. The unit will give years of reliable service, has very low operating costs and offers great flexibility," continues Oliver Claydon.

Following use of the Straw Harrow and TerraStar to help control weeds, the crop is autumn or spring drilled with the Claydon Hybrid. The front-mounted Inter-Row Hoe is used during the early stages of crop growth in the spring (about GS30-31) to control weeds that escape the autumn herbicide stack, or emerge once control has ceased. An aggressive blade, set at 2cm depth, slices off and kills the weed before the crop canopy closes over and shades out any further germination or renewed growth.

"In early drilled crops, there is the possibility of using it to take out the first flush of weeds in the autumn, reducing the number which the ag-chemicals have to control. We're also experimenting with slightly higher seed rates to

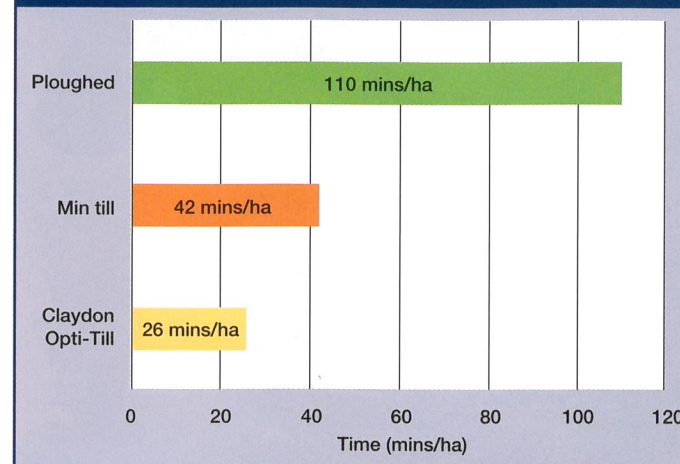


The front-mounted Inter-Row Hoe is used during the early stages of crop growth in the spring.

produce very high plant counts within the seeded bands and crowd out weeds from that area."

Designed for use on any tractor with a Cat II front linkage, at speeds of approximately 6 km/h, the hoe is manually steered with a 6m unit covering up to 40ha a day. A 177hp Claas Axion 640 on 600-section tyres has been used with the prototype hoe, although a lower powered tractor would easily manage, he claims. It works best where crops have been drilled accurately in a long-term Claydon system and where soil conditions allow early spring travel in between tramlines.

Time comparison for establishment systems



Source: Claydon

doesn't incorporate press wheels — consolidation is best carried out as a separate operation, he reckons.

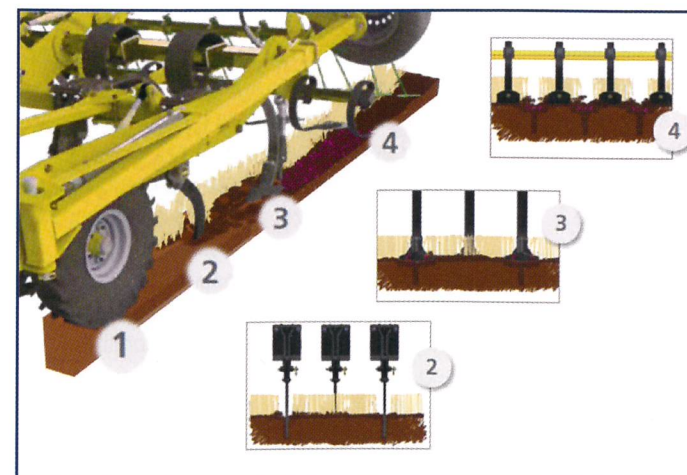
"With Opti-Till, you're not losing moisture, so the priority with the drill is to leave the surface level. It's best left 12-24 hours then followed with a good set of rolls, to stop soils from capping. The Claydon rolls are high spec, with 600mm diameter breaker rings, pressure controlled to deliver a uniform consolidation across the working width."

The result is a 10% yield increase since 2006 on the Claydons' farms at an establishment cost of around a third, claims Jeff Claydon. "It's not about moving soil, nor least

cost. It's doing the optimum tillage for the job — it's a system we've developed and continued to adapt and we always welcome customers to our farm to see it for themselves." ■

Innovation Insight

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Set on a rigid frame with front-mounted wheels (1) to set seeding depth, the drill puts a leading tine (2) in front of an A-share seeder (3) followed by a levelling board and/or harrows (4).