

Armaturen und Logistik aus einem Guss

SSI Schäfer lieferte Intralogistik für neues
Produktions- und Fertigwarenlager von Kemper

SPECIAL REPRINT
Translated from the German

Transport Logistic
Die spannendsten Themen
schon vorab lesen

Software
Mit neuer IT-Infrastruktur
den Erfolg sichern

Logistik-Management
Kosten in der Supply Chain
systematisch reduzieren

Practical and versatile

Testing Crown's multifunctional WAV 60 truck in real-world conditions

With the WAV 60 (or "Wave"), U.S. forklift truck manufacturer Crown now has a successor to the company's well-established Wave 50 in its portfolio. For years, this "mini lifting platform" has been a great alternative to rolling ladders. Now the new model sets the bar even higher, and during our test, turned out to be a genuine all-rounder.



Perhaps you need to change a lightbulb, or pick items for a small order – there are always some warehouse jobs for which you generally use a rolling ladder rather than a lift truck. You wheel the ladder to wherever it's needed, you climb up it, and you do the job. Often all goes well – but sometimes, things don't work out as expected. Because just like any normal ladder or staircase, there's always some risk of a misstep, slip, trip or other unexpected incident.

Back in 1997, Crown developed the "Work Assist Vehicle" – the WAV, or Wave – to make those "little jobs" as risk-free as possible. The WAV 60 is the manufacturer's latest, upgraded version of the multifunction vehicle. The lift truck is at least as versatile as its predecessor, the Wave 50, but even safer and more user-friendly than before.

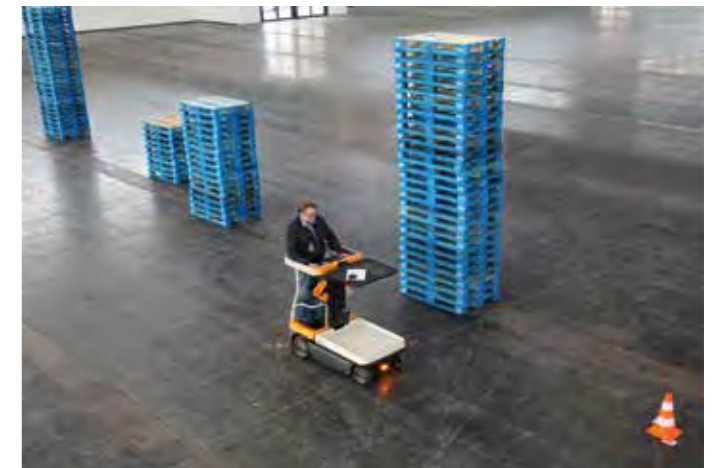
By making it possible to lift or lower people and goods while driving along, the Wave isn't just an alternative to rolling ladders – in terms of safety and speed, it is significantly superior.

Positive evolution

The Wave 60's operator platform can be raised to a height of 2,995 mm (Fig. 01), for a maximum working (reach) height of around five metres. In the course of upgrading the new model, Crown replaced the DC drive unit in the older version with a unit based on AC technology, which is more energy-efficient and needs much less maintenance.



01 The operator platform can be raised hydraulically to a height of 2,995 mm

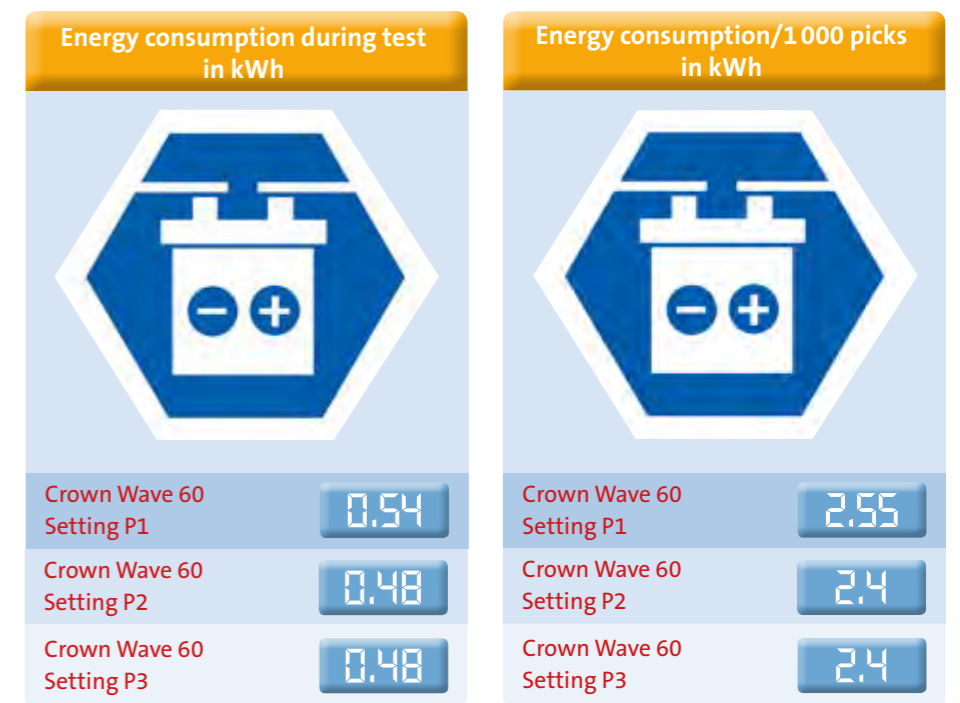


02 The specially designed test course was based on real-world warehouse conditions

Compared to the previous model, our test machine felt more powerful. The top speed has been raised from 6 to 8 km/h, and with the incorporation of additional steel components, the lift truck feels even more robust. Also new is the (optional) powered adjustment of the load tray, and the Access123 diagnostics system, with software that keeps track of the status of all vehicle functions. What's more, the new e-GEN braking feature automatically slows down the truck depending on conditions, and automatically engages the parking brake as necessary.

Test circuit with 16 stops

To enable us to put the Wave 60 through a genuinely informative real-world test, we developed an obstacle course (Fig. 02) designed especially for this kind of lift truck. Our test course simulated a warehouse situation in which a single item had to be picked from each of eight different locations.



| | Lifting speed [cm/s] | Travel speed (safety gate open) [km/h] | Travel speed (safety gate closed) [km/h] | Sprint over 10 m (gate open) [s] | Sprint over 10 m (gate closed) [s] | Practical battery life of 194 Ah battery [h:min] |
|--------------------------|----------------------|--|--|----------------------------------|------------------------------------|--|
| Crown Wave 60 Setting P1 | 28.52 | 8.37 | 4.98 | 5.00 | 7.90 | 10.38 |
| Crown Wave 60 Setting P2 | 28.52 | 6.51 | 4.09 | 6.20 | 9.30 | 11.72 |
| Crown Wave 60 Setting P3 | 28.25 | 6.43 | 4.72 | 6.50 | 9.4 | 11.76 |



03 The travel speed and operator platform controls are positioned on the right-hand side of the cockpit



04 The left hand is used to steer, adjust the height of the load tray, engage "creep" mode and control the work lights



05 The operator platform provides secure footing – before the truck will start, the operator must deliberately step on the round markings



06 We found the extensive storage options within easy reach of the driver very ergonomic



07 The battery can be charged from any standard electrical socket – a built-in charging cable is available as an option

The pick locations were distributed across two parallel warehouse aisles, and picking heights varied between 44 cm and four metres. When changing aisles, we had to steer the vehicle through a narrow passage to test its manoeuvrability. And then, after collecting all eight of the items, we had to return them directly to their original locations. This gave us a test circuit with 16 picks/stops.

Following our standard test procedure, we measured the basic travel and lift speeds, plus acceleration with open and closed safety (interlock) gates. Our measurements were broadly consistent with the manufacturer's claims. We found that speeds vary significantly when the platform

is lowered and the gates are open. In this configuration, the Wave reaches its top speed of around 8 km/h. Forward travel speeds are higher than reverse travel speeds.

Safety takes priority

We drove our test candidate at each of the three standard factory settings, P1, P2 and P3. Setting P1, not only allowed us to reach the truck's top speed, it was also the most pleasant setting in use – especially once we had become accustomed to the truck's agility. Until then, P2 was a good alternative. P3 is very restrained, and we felt it

would make most sense in working environments with very limited space.

The manufacturer has equipped the Wave 60 with a variety of safety features which, in our view, require some familiarisation. When starting the truck, you must step onto two separate areas marked out on the operator platform, one foot after the other. Once you've done that, you must then wrap your hands around the two handgrips. Only then can you start working with the machine. By twisting your right hand, you control the truck's speed and direction of travel (forward/reverse). Pushbuttons are used to raise and lower the operator platform (**Fig. 03**). You use your left hand to steer (**Fig. 04**). For this purpose, the left handgrip is fitted with a horizontal toggle switch; you steer the truck in the required direction by pressing down on the right or left side of the switch. You also use your left hand to control the height of the load tray, select "creep" mode, and control the work lights. In our opinion, these switches could be more clearly differentiated – we inadvertently engaged "creep" mode on several occasions.

Performance characteristics

Our test results show that in terms of productivity and energy consumption, there is a difference of around 6.5 percent between setting P1 (maximum) and setting P2 (economical). In "maximum" mode, we reached a theoretical number of 210 picks per hour or 3.5 picks per minute. Unfortunately, we didn't have a rolling ladder available to us for making direct comparisons during the test. But even so, it was easy to see that you could never achieve a comparable pick rate using a conventional ladder.

The advantage of the Wave lies primarily in the fact that you can drive in a controlled manner while simultaneously raising or lowering the load. The infinitely variable travel speed is governed by your working height. While standing safely on the operator platform (**Fig. 05**), you can

only raise it higher than 500 mm if the interlock gates are shut. The battery life of the 24 V/194 Ah batteries (four in series) is more than enough to last through a busy working day.

Test summary

With the load tray's 90 kg capacity plus the load deck's additional 115 kg capacity, coupled with a vertical reach height of five metres, the Wave 60 is versatile enough to be used as a mini lifting platform, a picker and a multipurpose vehicle. We liked ergonomic features such as the plentiful storage space (**Fig. 06**) and the ability to charge the zero-maintenance battery from any standard 230-volt socket (**Fig. 07**). What we felt was missing was an integral charging cable with plug (available as an option), meaning that we had to use a separate cable to charge the battery. Anyone who works frequently in

Verdict

- + Versatility
- + Working safely and efficiently at height
- + Compact
- Design of "creep" mode switch
- Predictability of steering motions/ learning curve

narrow warehouse aisles can opt to equip the truck with lateral rail guides. This makes it even easier to use, because you no longer need to steer it. We mention this only because the Wave 60's extreme agility means you must first learn how to handle the vehicle safely.

Text/Photos: Theo Egberts, Andersom Testing
Illustrations: VFV, Sonja Schirmer

About the test truck

| Dimensions and specifications | |
|---|------------------------|
| Length | 1 525 mm |
| Width of truck | 750 mm |
| Gross weight incl. battery | 645 kg |
| Height with extended mast | 4 090 mm |
| Height with retracted mast | 1 400 mm |
| Height of step to operator platform | 305 mm |
| Height of raised operator platform | 2 995 mm |
| Max. reach height | 5 000 mm |
| Max. height of load tray with load | 4 070 mm |
| Min. height of load tray with load | 1 380 mm |
| Min. turning radius | 1 205 mm |
| Load tray load capacity | 90 kg |
| Load deck load capacity | 115 kg |
| Battery voltage/capacity | 24 V/194 Ah |
| Speeds | |
| Lift speed P1/P2/P3 | 28.52/28.52/28.25 cm/s |
| Travel speed with open safety gate P1/P2/P3 | 8.37/6.51/6.43 km/h |
| Travel speed with closed safety gate P1/P2/P3 | 4.98/4.09/4.12 km/h |
| Sprint over 10 m with open gate P1/P2/P3 | 5/6.2/6.5 s |
| Sprint over 10 m with closed gate P1/P2/P3 | 7.9/9.3/9.4 s |

(All data is based on test team's research and measurements and may deviate from data provided by the manufacturer)

