

Review 9398: 4x4 Crawler

By Jetro

Set: 4x4 Crawler
Set number: 9398
no of pieces: 1327
Recommended retail price: 169.99 €

When LEGO® launched the 8275 - Motorized Bulldozer in 2007 there was a lot of expectation: a new system of motors was launched. After decades of the 9V system LEGO Power Functions appeared, and although there were also some other sets that year that included one or more elements of this new system, the Bulldozer was without a doubt the king as in a single set all the elements released so far were included (2x M-motor, 2x XL-motor, PF battery box IR receiver and IR remote). Additionally, the set was an interesting buy both for the set itself and for its value, as although it was the most expensive set in Technic line for that year, the large number of PF elements it included made it doubly attractive.

This year something similar happens from the time the first images of the box of the set appeared. It was clear there would



be some novelties, particularly where motors are concerned. The videos of the model in action taken at a toy fair helped get more information and to a certain extent the same thing is happening as with the Bulldozer: we have a set that is attractive in itself, with the additional attraction that it contains all the new PF elements at a very attractive price.

Opening Pandora's Box

The 9398 4x4 Crawler comes in the usual box for the largest LEGO Technic sets. The cardboard is rather thin, but the box includes a thick lid which on the outside shows the model on a rocky background and a band to the side with all the most attractive elements from the set. Opening the lid you can see the main characteristics of the set. On the back of the box the alternative model is shown, the instructions of which, as usual in sets of this size, are only available in for download from the official LEGO website. This year the alternative instructions have been made available at the same time as the digital instructions of the main model; LEGO has done its homework after the claims from the fans last year.



Upon opening the box and reviewing the contents we find the physical instructions well protected inside a plastic bag and on a sheet of cardboard to avoid them folding or deteriorating in any other manner. This means that also the sticker sheet is in perfect condition. Together with the building instructions there is a sheet that at first glance looks like a set of corrections. It is, however, a reminder to make sure that some of the key steps that might cause problems in the model's proper functioning are carried out correctly.

The parts come divided into bags marked "1" and "2", for the chassis and bodywork respectively, the PF elements come in separate bags and the wheels and rims unbagged.

The new PF elements.

As I already mentioned, the 9398 4x4 Crawler includes several new PF elements. The first of these is a new proportional servo motor. This motor has several characteristics that are worth pointing out. The first instructions you find in the instruction booklet, even before starting to build the Crawler, are related to this motor; you need to connect it to the battery box and briefly turn it on. This is because the servomotor only turns 90° left or right (depending on the polarity of the current applied) and after turning off the current the axis goes back to the "zero" position. In order to build the model correctly it is important to make the initial position of the servo motor is correct.

Another important feature of the motor is that it is proportional. In the 4x4 Crawler this feature is not used as the remote control in this set only allows you to turn the motor 90° in either direction. However, if instead of the remote that comes with this set you use the proportional Train remote you can see how the motor turns from its neutral position to the 90° angle in 7 steps /this can also be done using the rechargeable PF battery, regulating the intensity of the current with the built-in control).

The motor has two connection point for an outgoing axle, one on the front, below the centre of the motor, and the other directly behind it, so it looks as if an axle was connected straight through though in fact there is a 1L distance between the points. It also has numerous mounting points and in the 4x4 it is an integral part of the structure of the chassis.

The second PF element is the "L" motor. Just like the servo motor, it has many mounting points, making it easier to integrate in a Technic model than the "M" motor. Compared to this motor it has a turning speed that is slightly slower (at 9V and without load, "L"=390 RPM, "M"=405 RPM), but considerably more power (approximately 50% more torque and almost twice as much mechanical power[1]).



The set comes with 3 motors, but only one IR receiver as both "L" motors work in parallel. To make this possible it has been necessary to update the IR receiver. Previous versions allowed for the use of two "M" motors per channel, but the "L" motor requires a lot more power and this has been achieved in the new IR receiver which is marked "V2". Other than delivering more power, the receiver is no different from the previous versions.

Building the set

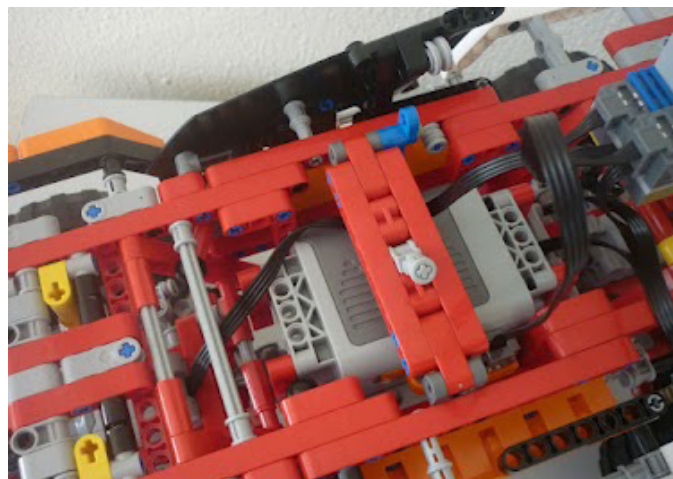
After building the central part of the chassis, with the servomotor as central element, the front and rear axles are connected - both are virtually identical. The connection between these parts of the chassis is made with the Steering Ball Joint Large that were first seen in the Unimog (8110). The Steering Portal Axle of the Unimog are also used to get a good ground clearance, as well as Technic links to keep the front and rear axles in line with the centre of the chassis, although the configuration is different from the Unimog.

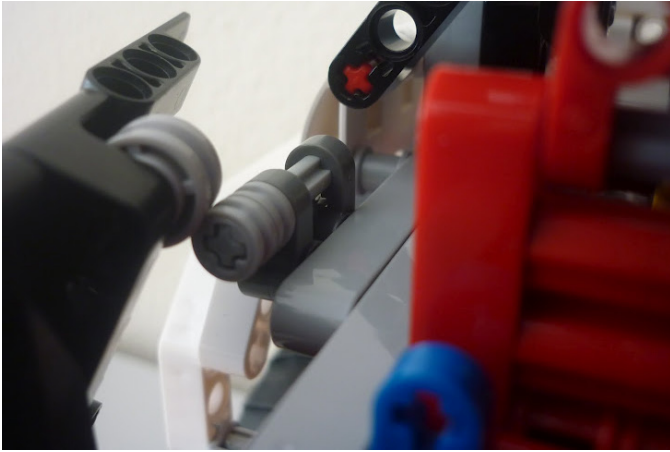
However, that is where the similitudes with last year's flagship end. While the Unimog was an eminently mechanical set, the Crawler is, at least at first sight, a lot "simpler". Even so, this model has a fair number of mechanisms and is in no way less interesting. The two "L" motors are placed on top of either axle, providing a relatively direct transmission system to the wheels. Between the motor exit and the axle for the wheel there are still 5 pairs of gears (6 if you include the internal gearing of the differential), 4 of which reduce the speed to a little under 1 Km/h, but increasing the torque at the wheels by a factor 1:6.48.

More novelties

The PF motors are not the only novelty in this set. There are also a few other new parts. It is the first appearance of the 10197 Axle and Pin connector 90° in a Technic set (previously this part had been seen in Monster Fighters and Ninjago - it is interesting how there are more and more Technic elements in other themes).

There is also a new axle 4L (Tan) with a centre stop. At first sight it isn't evident why this new axle is better than the well-known black 4L axle, but while building the model it becomes clear it is a great addition. When building the differentials with this axle, the stop prevents the axle from going too far into the differential, causing problems with friction. When connecting the front and rear axles to the central part of the chassis the stop on these new axles prevents them from falling out and when using them in the "L" motors it ensures the axles don't





fall out due to vibration and other forces in the model. Is this model really that powerful? Well, we'll see what it is capable of further down, but there is no doubt that the designers it was important as for example the 3L axle on which the upper gear in the Portal Axle turns has been blocked against coming out by a piece whose only function is just that.

Well Built

The construction of the chassis is very compact and a lot of care has been taken in placing the gears in such a way as to ensure they are completely locked in.

Also a lot of attention has been given to making sure no mistakes are made during the building process. To this end some elements have been included whose sole purpose is to "force" a correct construction. A good example of this is the inclusion of an Axle Pin and Bush in the frame that is the basis of each axle. It's only function is to force a specific orientation of the differential. Due to the compact nature of the construction a mistake like that would be very hard to correct later on (without dismantling almost the entire axle) and would have disastrous results as an incorrect placement of the differential would make the axles work against each other.

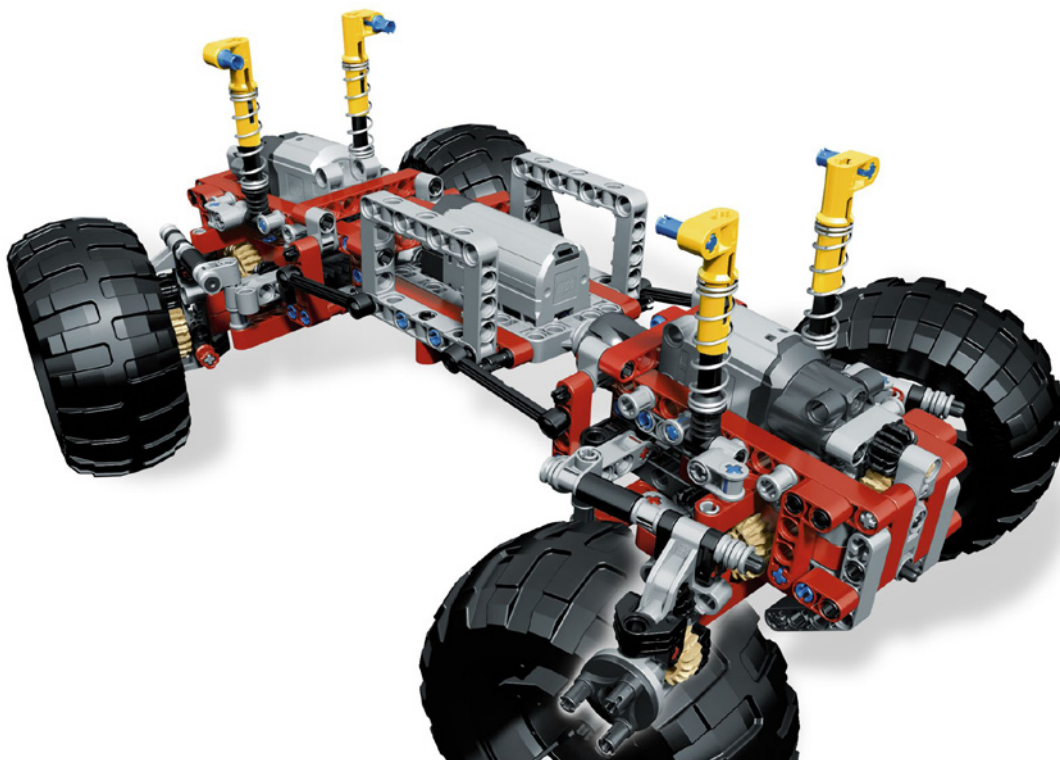
There are also structures that serve to correctly align the wheels and the steering mechanism. This is important as just as in the 8880 Supercar, the axles steer in opposed directions, allowing for a considerably reduced turning radius. The result of these constructions (which are later dismantled to reuse the pieces in other parts of the model) is that there are some elements in the model (pins and axles) that stick out for no purpose afterwards. Fortunately these are quite well hidden and don't make the finished model look any the worse.

Finally it is interesting to mention the mechanism of the doors. On the one hand they are built to limit the opening angle and on the other (more importantly) they have a closing mechanism - an element on the inside of the door that hinges on another in the chassis. In this way the doors can't open by accident.

The bodywork

Although I am still not convinced about the colour scheme of this model (red, grey and black for the chassis, black orange and white for the bodywork) it is an excellent way to include some elements in colours that fans had been asking for. It is the first time the Panel Curved 11x3 appears in white and a number of elements are added to the list of available parts in orange.

Just like the chassis, the construction of the upper part is very robust. In addition, the system for connecting the body to the chassis uses a hinge construction at the back, allowing the whole upper part to lift (as if it were one large hood) to provide access to the battery box compartment. This is located on top of the servomotor. As a consequence, the centre of gravity of the Crawler is a little high, but there is no better place in the model without making big changes. Curiously, the battery box is not fixed but "trapped" between the servomotor and a bar on top which is locked in place with a latch. Taking out and putting in the battery box is very easy and in order to turn it on or off there is easy access opening the door on the side of the driver (which curiously is part of the chassis).



Let's play!

The 4x4 Crawler is surprisingly robust and very powerful for a LEGO® toy. Evidently it's no match for other radio controlled vehicles, but the concept is completely different. Even so, the long travel of the suspension and the power of the "L" motors make it a vehicle that is slow, but prepared to face serious obstacles. Keep in mind we are talking about a toy made with plastic pieces and as such the designers have tried to reach the limits of what is possible, but maintaining a safety margin for the integrity of the pieces.

How does the vehicle respond to uneven terrain? On the first pages of the building instructions LEGO advises this is an indoor toy. Not only because of the interference direct sunlight can have on the IR signal from the remote, but also because the gears and motors are not protected against external elements (mud, water) that would deteriorate them. Even so there are already several videos on YouTube showing the Crawler outside with a very reasonable performance.

It would be a mistake to compare this set to the Truck Trial vehicles made with LEGO and their performance. Although it is true that those are comparatively more powerful and manage to overcome much bigger obstacles, the techniques used in these vehicles are not appropriate for a children's toy. These vehicles go beyond the safety limits (more than once a gear or even other LEGO part is broken due to their extreme power), at least for a toy in the hands of a child, which doesn't mean that the selection of parts included in this set isn't an interesting starting point for those who want to get started with Truck Trial, maybe starting by modifying the original design of this set.

Overcoming indoor obstacles, the 4x4 Crawler is powerful. Due to the reinforcements, the distance between the floor and the axles of the Crawler is slightly less than in the Unimog, but the height of the central part allows the Crawler to, for example, climb onto its own box without much complication. The fact that the centre of gravity of this vehicle is relatively high means that, even though the suspension has quite some travel, if one side is lifted too much it rolls over quite easily. This is where the robust design and the closing mechanism of the doors



prove their importance. Even after rolling over several times the Crawler is still intact and no parts have come loose. It's great fun to play with the Crawler and experiment with the best angle for overcoming different obstacles.

For the Technic lover not all the fun is in remote controlling a vehicle. The mechanisms and their design are also important. One thing that stands out in this model is that although it isn't conceived as a modular set, it is very easy to disengage the "L" motors (maybe to use them in another project :D). Pulling out 4 Pins with Stop Bush the motor comes out easily. It only requires taking out another two bushes with their corresponding Axle Pins and the Links on either side of the axles and you can disengage the Steering ball Joint Large, effectively separating the entire rear and/or front axle. Ready to start making modifications!

Another easier option is to customize the top of the Crawler. The B-model instructions already give an idea of the possibilities of this model, turning it into a truck. The first proposals have already surfaced, like for example a Buggy (modifying the angle of the suspension as well). Are you ready to start experimenting with this set? I'm curious to see all the modifications that will no doubt be shown on different forums and picture sites.

Let's play!



[1] technical information extracted from Philo's motor comparison page <http://www.philohome.com/motors/motorcomp.htm>

Acknowledgements: LEGO SYSTEM A/S and Jan Beyer for this set.

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