

# Land Rover History

## The Cuthbertson Conversion

What on earth is a Cuthbertson conversion I hear you say??

Intended for use on marshy terrain these conversions were carried out by Cuthbertson & Sons in Biggar, Scotland in the early sixties. The conversion took a standard land rover, and added demountable tracks to it. The ground pressure, at about 2 lbs per square inch, is less than the human foot making them ideal for the application of herbicides and fertiliser on crops, leaving minimal compaction and damage in conditions where wheeled vehicles would destroy the crops. At least one was used in this capacity with a crop sprayer on the back. Also on marshy and soft ground, it enabled the vehicle to continue where others would become bogged.

The exact numbers that were built were lost in a factory fire in 1967, but it is believed that 40 units including 3 prototypes. The final conversion was thought to have taken place in 1972. Unusually, a surprisingly high number of these have survived. About thirteen are still known to be in existence. Of them, 2 are in museums, three plus a spare sub-frame are in the hands of collectors, one was used under a lightweight as a crop sprayer and one was seen abandoned on the side of the road in Italy. Cuthbertson, who are still in business, still have the prototype and the remains of probably four more. The rest have either been scrapped or are lying as piles of rusty metal.



Each track is carried by four skinny, rubber-tyred road wheels and drive sprockets replace the Land Rover's normal road wheels. The four tracks are mounted on a sturdy sub-frame to take the stresses which would otherwise be placed on the Land Rover's wheel hubs. Because all of the land rovers original running gear was retained in the conversion, suspension and braking were still carried out by the usual parts

of the vehicle. The ground clearance of the vehicle increased from around 8 inches (200 mm) on a standard land rover, to 21 inches ( 525 mm).

The tracked Land Rover's steering is like that of a normal car but the effort to turn the tracks comes from a hydraulic power-steering pump driven off the front of the crankshaft. Due to the size and type of the tracks, the steering can only be turned when the vehicle is in motion as any attempt to do so while stationary would result in a bent steering arms.



Speed of the vehicle was limited to 30 mph as the sprocket was only 47% the size of the original wheels. Although this was a disadvantage on the road, off road the lowered gearing gave a fantastic climbing ability.

The wheels are standard Dunlop pressed steel rims and stub axles as used on dumpers and cement mixers, but modified by Cuthbertson with a steel disc fitted to the side to protect the tyre and a cover welded to protect the valves. 3.50x19 motorcycle sidecar tyres were then fitted to the wheels with reinforced inner tubes. It was the cessation of manufacture of these wheels by Dunlop that led to the ultimate demise of the conversions as experiments with solid wheels and the Mini 10 inch wheel, proved to be unsuitable, so production finished.

Given the extra height that the conversion brought, you would think that in the real world it would be completely unsuitable as the center of gravity would be extremely high. However due to the heavy construction of the conversion, the center of gravity is actually very low and the 45 degree side angle operating limit of the original vehicle was still possible if the drivers nerve held that long.

Unusually for a conversion like this, it was constructed from proper engineering drawings . There is even a parts book with exploded parts diagrams. This sounds like a lot of work for the small number of vehicles produced, but it would seem to indicate that there were plans to sell a far higher number of these vehicles than were eventually produced.

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The cost was said to have been about the same as the base vehicle. In the early sixties a 109 diesel was about £850 depending on exact specification, meaning the Scottish Electricity Board (SSEB) vehicles would have cost them about £1700 as they were new vehicles on conversion, not cheap by any means, but there weren't a lot of options for vehicles to fulfil the role at that time.

The prototype was built on an already well used Series One 86 inch vehicle, which did extensive testing. Pictures of this vehicle dated October 1961 were published in the farming press. The production vehicles differed from the prototype as the axles and chassis were different dimensions and most used box section tubing instead of the prototype's round tube sub frame. The blueprints are dated May 1962 suggesting production started soon after this date.



The production vehicles were mostly based on 88 or 109 inch Series IIs many having the 2-litre diesel engine and, most surprisingly, it copes well with all the weight. Customers were varied. The SSEB bought several units based on 109 inch hard tops for transporting men and tools up to remote sites often towing poles strapped onto small bogies. The Ministry of Defence bought some to be fitted to 88 inch soft tops or truck cabs for bomb disposal work with the RAF. Their intended use is unclear but the story that they were for recovering atomic weapons from crashed aircraft in difficult terrain cannot be ruled out. They were then rendered obsolete when helicopters came into use capable of lifting greater loads. Some went to the big estates in Scotland and were used for transporting guns and retrieving game from the shooting moors.

An interesting conversion was used in Holland for survey work on mudflats and tidal areas. Big rollers were fitted front and rear to the Cuthbertson sub-frame, reducing ground pressure even further in the mud. In deeper water they became floats and an outboard motor powered the rig back to dry land.

The Australian army even had one for evaluation trials. The vehicle travelled over 600 miles on trial over a period of some 9 months. Many problems were encountered, mainly due to the hard, dry ground of the test area. Whereas the vehicle was designed to operate in the rather wetter conditions of the United Kingdom.



However the real world use of these vehicles was somewhat reduced. They worked very well on soft ground but did have some problems climbing banks. This was mainly because the tracks lacked the front ramp on the tracks like many tanks have allowing for the track to grip higher on the obstacle.

The Rover Company ran a program where vehicles or equipment was submitted to their Special Projects department for testing. If approval was granted then the base vehicles would still carry the full manufacturer's warranty. A Cuthbertson conversion was submitted and did, indeed, gain approval.

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