

M.W. Groenendijk *De weg-multi-trailer.- 2 dln*
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The congestion at the Dutch freeways is increasing, while a big part of the infrastructure is not in use at night. With the help of multi-trailers goods can be transported in bigger batches at night. Behind one tractor five trailers will be coupled. The total combination has a length of about 80 meter. The steering mechanism is designed in such a way that each trailer follows the same track when making a turn. The intended velocity of the multi-trailer which will be driving over the freeways (road-multi-trailer) is 50 km/h. The road-multi-trailer has the safetrail mechanism. This system associates stability at high speed with maneuverability at low speed.

The road-multi-trailers can transport two 20 ft. containers, one 40 ft. container, or one 45 ft. container. Containers with a height up to 9,6 ft. can be conveyed. The weight of the trailer is about 9.200 kg. The maximum weight of the cargo of the road-multi-trailer is about 38.800 kg.

The road-multi-trailer will be provided with two steering front axles and two steering rear axles. The steering system makes use of turntables. The DK 90/13 turntable from BPW will be used for the first axle. The other axles make use of the DK 90/12 turntable. The first axle will be connected with the steering arm by means of a cable mechanism. The second axle will be steered by means of a control lever from the first axle. Both rear axles will be steered from the second axle by means of a torque pipe.

The chassis of the road-multi-trailer will be build by Buiscar and consists of two HEB-260 beams. The eight crossbeams consist of HEA-220 and HEA-140 profiles for respectively the first axle and the second, third and fourth axle.

The road-multi-trailer will be provided with 265 / 70 R19,5 tires from Michelin in double air configuration. The axles will be provided with air suspension from Weweler. The shock absorbers are from Koni and the axles are TE3 TZ3 axles from Mercedes-Benz. All axles will be provided with disc brakes. The braking system consists of ABS and BBS from WABCO.

The cost price of one road-multi-trailer is about 110.000 dutch guilders.

Simulations are executed by means of the multi-body-program ADAMS. The simulations showed that the road-multi-trailer complies with the requirements for long trucks in the Netherlands (the requirements of the RDW). The requirements for Road Trains in Australia are also simulated. The only requirement not complied is driving a curve with a transverse acceleration of 0,2g, with a maximum deviation of the fifth trailer of 0,5 meter.

The steering system is also simulated. The simulations turned out that the deviations of the steering system are acceptable. The simulations also proved that it is possible to use two control levers for the connection between the first and the second axle.

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