



Reliability in fire service operations - MAN at Interschutz 2015

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Fire brigades and disaster relief organisations rely on emergency vehicles from MAN.

MAN is presenting a wide range of rescue vehicles which meet sector requirements at Interschutz 2015 in Hanover, the world's international trade fair for fire prevention, disaster relief, safety and security.

The innovations exhibited by MAN at the trade fair include many sector-specific features: Euro 6 engines for rescue vehicles, integration of Allison automatic gearboxes in the driveline, electronic stability programme (ESP) for rescue vehicles with engageable all-wheel drive, crew cab combined with Euro 6 emission control system and payload optimisation in the TGL series.

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Country-specific flexibility: Euro 5 and Euro 6 engines

For fire services and disaster support organisations in Europe, MAN is offering an extensive product portfolio for permissible weights of 7.49 to 44 tons, from three series TGL, TGM and TGS and in both Euro 5 and Euro 6 emission classifications. MAN engine production in the Euro 5 variant is assured for emergency services vehicles up to 2018. This is because not all European countries have made the Euro 6 emission classification compulsory for emergency vehicles. Euro 6 has been required for goods traffic since 2014. As a result, in some countries - Germany, Austria and Great Britain, for example - vehicles with Euro 5 engines can still gain approval on an interim basis. The smaller and lighter emission control systems offer benefits in terms of body design. In addition, Euro 5 engines in the MAN TGL and TGM series do not require AdBlue additive for emission control, thus making handling easier and offering advantages in terms of payload.

MAN is extending its offer in Africa, Asia and Australia/Oceania with a TGS series variant, designed for use on difficult terrain and in extreme weather

The MAN Group is one of Europe's leading industrial players in transport-related engineering, with revenue of approximately €14.3 billion in 2014. As a supplier of trucks, buses, diesel engines, turbomachinery, and special gear units, MAN employs approximately 55,900 people worldwide. Its business areas hold leading positions in their respective markets.



conditions. The engines are available with Euro 2 to Euro 5 emission classifications as required in the specific country.

Easy to build on: MAN chassis in Euro 6 variant

The introduction of low-emission Euro 6 vehicles with their extremely effective, yet technologically sophisticated, emission control system sets new challenges for body builders. They have to take into account the additional space needed for components such as the exhaust system and the additional AdBlue tank - larger than those used in the Euro 5 category - as well as factor in the additional weight in the payload and weight distribution. In fire service vehicles, space is taken up on the sides of the frame by the deep tool compartments between the axles and the sills on both sides for access to the extended cab. This means that components such as the diesel tank, AdBlue container, air intake, battery box, compressed air tank and emission control system, which would normally be fitted in that area when using a standard chassis, have to be placed elsewhere. Technological constraints with Euro 6 emission control components limit creative freedom in doing this.

With close cooperation between MAN and the body builders, it has been possible to develop solutions which can be supplied ex works in order to continue to provide, as usual, the various access systems in the crew area such as stairs and fold-out or rotating steps. The storage space in the deep tool compartments at the sides is also retained to ensure unloading is optimised from an ergonomic point of view. The air intake is located on the centre of the frame under the extended cab. The compact exhaust silencer is moved further back on MAN fire service vehicle chassis in the TGL and TGM series or fitted with rotation through 90 degrees. Within the guideline for fitting bodies, body manufacturers are permitted to move the 10 litre AdBlue container to the position which suits it best.

MAN vehicles used on fire service operations are also given a so-called 'Behördenmotor' - or 'public authority' engine. In order to avoid putting the success of a rescue operation at risk, this deactivates the torque reduction required by law in the event of a serious malfunction in the emission control system, for example if the AdBlue container becomes empty. Following the operation, the cause of the error message shown in the display must be resolved and the fault cleared.



The MAN range of fire-fighting vehicles

Light weight: MAN TGL

The MAN TGL series with high payload scores well in fire service operations. The two-axle chassis with on-road drive rolls off the production line at the MAN plant in Steyr with many different variants in the 7.49- to 12-ton weight class. The four cylinder engines produce 150, 180 or 220 hp in Euro 5 and Euro 6 emission classification. The most powerful engines in the series can deliver 250 hp. The rescue services range is extensive: With its range of wheelbases, frame lengths and cab variants, MAN TGL represents the ideal base for small fire fighting vehicles - referred to as TSF-W, MLF, LF 10 and HLF 10 in the German Standard Vehicle catalogue - small water tender fire fighting vehicles, gear trucks, control vehicles or logistic vehicles.

MAN has optimised the chassis weight of the MAN TGL in order for it to be approved as an MLF small-tender fire service truck with a 7.49-ton total weight. This makes it possible for holders of the former German category 3 driving license and of the so-called "Fire Brigade License", which has been introduced in some German states, to drive this vehicle. In some states, the MLF may weigh up to 8.5 tons, although a truck driving license is required for this. Small weight-saving measures in the vehicles have presented body manufacturers with the opportunity to create a fully equipped MLF at a weight of 7.49 tons in both the Euro 5 and Euro 6 variants. The fitting of lighter batteries, seats and rims, the omission of items not needed for emergency operations such as rear shackles and jacks, and the cross member needed for a trailer coupling, all contribute to the reduction in weight.

The spacious crew cab, with space for up to seven people, is part of the success of the MAN TGL amongst fire services. It complies with the requirements of DIN EN 1846. The four-seater bench consists of a seat with individual backrests, headrests and three-point belts. Two seats with integrated breathing apparatus can easily be accommodated in this cab. This means the crew can equip themselves on route to the incident and no time is lost for rescue and fire control.

All-rounder for every kind of operation: MAN TGM

The TGM series commands the largest share of the fire service segment. MAN TGM base is used most frequently for various sizes of crew fire



fighting trucks, turntable ladders and telescopic masts, gear and recover trucks, hose layers and swap-body vehicles.

Series characteristics:

- Large fire service weight range of 12 to 18 tons in permitted total weight for the two-axle vehicle.
- Entry-level engines from 250 hp which can be extended with both the 290 hp and 340 hp performance levels of the six cylinder common-rail engine.
- Ample space available in the local cab C, the longer crew cabs L and LX and in the crew cab. These impress with their easy access, high-quality equipment and, at the same time, ease of use.
- On-road and all-wheel drive which can be combined with various suspension systems including leaf/leaf suspension, leaf/air suspension and four corner air suspension.

MAN installs air suspension in the rear axle as standard exclusively in the 13 ton all-wheel version. Its electronic control sets a constant driving level, irrespective of how full the water tank is. This improves driving stability and safety. Rolling movements of the body are more sensitively and quickly compensated for. The bellows in the rear axle can be deaerated at the touch of a button. This lowers the body by up to 15 centimetres, making the loading of the fire service's technical equipment significantly easier.

The fire service variant of this chassis version, which can be loaded or unloaded in the range from 11.99 to 15.5 tons, differs in some respects from what is otherwise a normal all-wheel drive vehicle. The cab is lower on the frame, because fire services need, on the one hand, all-wheel drive and clearance below the axles, whilst on the other hand they also want an entrance that is as low as possible and a low overall height including body in compliance with the specified vehicle standards. MAN shifts the air intake and exhaust system further back on the frame for fire fighting vehicles, which are given a long crew cab either by the body manufacturer or by means of MAN modification. The sector-specific equipment includes power take-off to drive the fire extinguisher pumps, a mechanical drawbar or power generator; fittings for the assembly of special signalling systems; shackles for fastening loads to the bumper and at the end of the frame; and engine start and stop equipment. This enables the driver to start or stop the engine from the pump control panel.

The full-air suspension with on-road drive, also available for the TGM series, enables the vehicle to be lowered by a few centimetres if it has to



clear low throughways or fire station doors. The turning circle is also reduced due to a large steering angle.

For heavy-duty loads MAN TGS

MAN has become established in the 18 ton plus weight class. Typical uses of the MAN TGS include heavy fire fighting vehicles, large water tender fire fighting vehicles, water tank trucks for industrial facilities and airports, turntable ladders and telescopic masts with a high rescue height and swap-body trucks. This is made possible by the many different variants in the series with two, three or four axles which can be combined with leading or trailing axles. Leaf/leaf suspension, leaf/air suspension and four corner air suspension can also be selected as optional or permanent all-wheel drive. MAN offers the innovative HydroDrive drive system on the TGS series. The two- or three-seater M cab is standard. Longer L and higher LX cabs can also be ordered on request, which then provide more space behind the seats. The performance range of the efficient six cylinder inline engines extends from 320 hp to 480 hp with interim levels of 360 hp, 400 hp and 440 hp.

Choice of three gearbox variants

The classic choice is the manual transmission from the 6 speed in the MAN TGL, to the 9 speed in the TGM, through to the 16 speed in the TGS series. The fire services are showing increasing interest in what has become established over the last decade in long-distance and distribution transport - the MAN TipMatic automatic gearbox. It is available in all MAN series. The driver is able to concentrate much more on what is happening in traffic and how other road users are behaving because he does not have to reach for the gear lever, select the appropriate gear and coordinate the use of the clutch and acceleration pedal. Hands remain on the steering wheel, the attention is devoted to the traffic. The use of the rotary switch, located next to the seat and easily accessible, is straightforward: One turn selects forwards or reverse.

In all-wheel drive vehicles, the switch setting Dx for "Offroad" is added. To optimise propulsion on sand, in mud or on a gradient, the gearbox has been programmed not to shift until the engine speed is higher and to keep the shifting process extremely short so that there is no noticeable interruption in tractive force.



As the driving style of a fire service vehicle, which is designed for efficiency in normal city and longer distance driving, differs on an emergency call, MAN has been offering TipMatic for emergency services vehicles since 2013. Their shift strategy in the switch setting Ds, is the result of close consultation with fire service users. Shorter shifting times, increased shift speed and a special downshift strategy when braking results in more powerful acceleration. Depending on the model, this is available ex works or can also be retrofitted for the TGL, TGM and TGS series. The emission classification, engine performance and design of the driveline all play a part in this. It is easy to change between gearshift programmes D, Ds and Dx whilst driving.

The third alternative in terms of gear selection is enjoying its première at the Interschutz 2015 trade fair - the integration of the torque converter automatic gearbox, supplied by Allison, in the TGM and TGS emergency services vehicle chassis. As an option, it can also be fitted with an integrated retarder. Operation is user friendly via a control lever on the steering wheel. While this TGM series 3000 gearbox type is only available with the Euro 6 engine, the series 4000 is available in the Euro 2 to Euro 6 emission classifications.

Integrated safety: ESP for all-wheel drive vehicles

Depending on the series, MAN will be offering the ESP for two-axle vehicles with engageable all-wheel drive from the first quarter of 2016. The legislature only requires ESP for road chassis. However, chassis are very often ordered for fire service vehicles with all-wheel drive in order to be able to reach incidents off the road in an emergency. However, these vehicles are mostly driven on surfaced roads. With their commitment to also offer ESP in the all-wheel drive designs of the TGM and TGS series in the Euro 5 and Euro 6 variants, MAN is increasing safety in emergency call response.

Success story: 10 Years of MAN HydroDrive

In 2005, precisely 10 years ago, MAN was the world's first truck manufacturer to introduce an engageable hydraulic front-axle drive as an intelligent addition to the traditional all-wheel drive in the TGA series. Today, MAN HydroDrive is available in the TGS and TGX series. This technology is ideal for operations with occasional off-road deployment and



for situations in which additional traction is needed on the front axle. In normal operation, TGS trucks equipped with MAN HydroDrive drive as usual with rear-wheel drive. If the driver needs more tractive force and greater safety when driving on unsurfaced routes, hills, downward gradients or on slippery carriageways, then he can activate the system using a rotary switch without stopping and when carrying a load. In these situations, it provides secure traction, both forwards and in reverse. When you're driving downhill and the HydroDrive is engaged, the continuous brake also acts on the front axle and stabilises the vehicle.

The system consists of a hydraulic pump flanged to the gearbox output and wheel-hub motors on the front wheels. It is active up to a speed of approximately 28 km/h. At higher speeds, it switches itself off automatically. If the speed drops again, it automatically reactivates. With a four-axle chassis, the hydraulic motors are in the second steered front axle.

An emergency services vehicle fitted with HydroDrive combines the advantages of a road chassis with the choice of additional traction which can be called on when required. The vehicle design height remains unchanged. This permits ease of entry similar to that of a road vehicle, lower height of the top frame edge and the overall vehicle, lower centre of gravity and thus optimum driving stability. There is no change to the turning circle of the rear-wheel drive design. Due to the system, a vehicle equipped with HydroDrive weighs slightly more than a traditional road chassis. However, it has a higher payload compared to an all-wheel drive vehicle because it weighs several hundred kilograms less. These points argue in favour of fitting MAN HydroDrive for two-, three- and four-axle swap body vehicles, which are being deployed increasingly by fire services. Compared to an all-wheel drive vehicle, higher interchangeable containers with internal standing height can be put on thanks to the lower height of the top frame edge.

Customised MAN modification

The transformation of a MAN chassis into an emergency services vehicle by a body manufacturer sometimes requires prior modifications to the chassis, cab, driveline or electronics in order to fulfil requirements specific to the country or to meet the customer's sector-specific wishes. This is a job for the staff at the MAN Truck Modification Centre. The range of services covers everything from individual consulting to quality assurance in



compliance with the strict MAN quality standards. In this way, MAN ensures both technically perfect and economic solutions.

An extensive range of services is offered for cab bodywork in order to meet the demands of fire services. For example, cab roof lowering for turntable ladder parks or the masts of aerial rescue platforms, and to reduce the overall vehicle height for low throughways or fire station doors. The lowering saves approximately 130 millimetres for the TGM's C cab and approximately 190 millimetres in the TGS series with the M cab. Corrosion is not an issue as the roof parts used are made from fibreglass reinforced plastic. Extending the C cab for both the TGL and TGM series by approximately 265 millimetres creates more space behind the seats to accommodate personal protective equipment or other items of equipment. This also enables compressed air breathing apparatus to be mounted in the back rest of the co-driver's seat.

The crew cab for the MAN TGL and MAN TGM also comes from MAN Modification. It provides room for a crew of nine emergency workers. The crew area is arranged with three rear-facing seats and four facing in the direction of travel. If country-specific licensing provision permits, the installation of a middle seat between the driver and co-driver can increase the number of seats to ten. The 90 centimetre wide doors extend up to the edge of the slightly raised roof and open almost to right angles, thus facilitating easy entry and exit. MAN offers this cab in two lengths, with the longer variant allowing the assembly of a maximum of seven seats with integrated breathing apparatus brackets. This cab can be described as spacious, comfortable and safe. It meets the crash test requirements according to ECE R29 and the requirements for safety belt anchorages according to ECE R14 with three-point seat belts fitted to each seat.

The MAN Truck Modification Centre fits the L and LX cabs, which can be ordered in all three series, TGL, TGM and TGS, with a 4-seater bench in the second row in place of a bed. There is then space for six emergency workers, which is a particular requirement for customers from export markets.

Buses from the MAN and NEOPLAN brands also have a role to play with the fire services, rescue services or disaster relief. They are used in operations as control vehicles or crew buses. MAN offers customer specific conversion for these tasks at the Bus Modification Centre in Plauen for both new and used vehicles.