



You can build on MAN.

Munich, April 11, 2016

MAN showcases integrated solutions for the construction sector at bauma 2016

MAN will use five exhibits in hall B4, stand 225, to showcase its expertise in the construction sector. The display on the stand will include a crane tipper from the TGL series, a two-axle MAN TGS with HydroDrive as a semitrailer tractor, a payload optimized truck mixer on a four-axle MAN TGS, a MAN TGS designed for 33 tonnes for the mining industry and a three-axle MAN TGX tipper with the new 560 hp D38 engine. Five other vehicles will also be located in an open space in front of hall B4 at the exit next to the stand. Here, MAN is exhibiting a MAN TGX 41.640 heavy-duty semitrailer tractor with the D38 engine, a five-axle MAN TGS designed for a gross permitted weight of 50 tonnes with a truck mixer body, a MAN TGS with triple-axle arrangement provided as standard, and a MAN TGM in all-wheel drive version. There is also a racing vehicle, which was used for the Dakar rally at the start of the year in South America.

The focus of the MAN product range is on the needs of the user - true to the trade fair motto, "You can build on MAN.". MAN's sector-specific focus can be seen in many areas, for example in the choice of three possible all-wheel drive technology designs.

- The **MAN HydroDrive**, an optional hydrostatic drive in the front axle, is the perfect addition if the vehicle travels predominately on sealed road surfaces and only occasionally needs additional traction.
- The **optional all-wheel drive** is the first choice for occasional driving on more challenging terrain.
- The **permanent all-wheel drive** is ideal for applications where a high-level of traction is often required and where there is wide variation in road holding conditions.

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A success story continues: MAN HydroDrive

The presentation of the MAN HydroDrive in 2005 marked MAN's launch on to the market of a new drive technology variant for trucks. The technical solution of a hydrostatically driven front axle to increase traction when required and to deliver a strong braking effect on steep off-road slopes was received very positively in many sectors. MAN is offering this system to the market in a wide range of configurations. It is available for two, three, and four-axle vehicles in the TGS series and for two and three-axle semi-trailer tractors in the TGX series.

Typical areas of application are unsurfaced roads and construction sites, farm and forest tracks and unclean roads, or roads covered in ice and snow. The benefit of the hydrostatic front-axle drive really becomes evident when having to negotiate an off-road slope without a load. A typical example of this is the tilting articulated train which has unloaded at the bottom of a mine. The rear axle, now under very little load, lacks traction on the incline.

At bauma 2016, MAN is to announce an extension to its range of drive configurations in the TGS and TGX series with the D20 and D26 engines. The innovation of the HydroDrive design combined with MAN TipMatic system will be available to order from IAA 2016 trade fair onwards which takes place in September. Both the "on-road" and "off-road" gear shifting programmes are available. Milk collection vehicles offer an example for the on-road application of the gear shifting software, and semitrailer tractor tippers and wood transporters for off-road applications. Limitless applications exist for the engine and gearbox-dependent power take-offs.

MAN has continued to develop this system and improve its operation in practice for users. MAN optimised the routing of the hydraulic lines with the introduction of the Euro 6 design. The clearance around the wheels increased, allowing for larger rims and tyre widths - even with tyre chains attached.

The driver activates MAN HydroDrive using a rotary switch both under load and whilst driving. The system switches off automatically above a speed of 28 km/h. The system re-engages without driver intervention if the speed drops below 23 km/h.

The payload advantage compared to conventional all-wheel drives is one of the recognised benefits of MAN HydroDrive. The weight advantage is 500 to 750 kilogrammes depending on the vehicle configuration. From a business perspective, the fuel saving represents a further benefit - when the system is switched off, the front wheels rotate freely, as with a road



vehicle. MAN also offers this additional traction for vehicles with a normal height design. The low frame height makes it easier for drivers to enter and exit the cab. The body's lower centre of gravity has a positive effect on driving stability. All MAN TipMatic and MAN HydroDrive components are located below the top edge of the frame. A feature of MAN's offering is therefore the unlimited options available when mounting the body.

On descents, the HydroDrive transfers the engine braking effect to the front axle. This provides safety and directional control on slippery ground, and improved vehicle control as a result.

A plus for payload: new light hypoid tandem axle

MAN will launch a new light hypoid tandem axle unit for payload-sensitive transport tasks at bauma 2016. When compared to fitting a planetary axle, this weighs in at approximately 280 kilogrammes lighter. The weight advantage achieved is 180 kilogrammes when compared to hypoid axles currently available with a 13-tonne load capacity. In terms of truck mixers, this means, for example, that it is possible to transport 180 kilogrammes more concrete or water. The requirement for the use of thermo-insulated bodies when transporting asphalt adds additional weight. The operator is now able to compensate for this payload loss with a lighter axle unit. With a technical gross combination weight of 60 tonnes, there are also applications outside the construction sector in distribution and long-distance transportation.

This tandem axle unit also offers other advantages besides the payload argument: The fuel used is slightly lower compared to vehicles fitted with planetary axles. In a direct comparison of hypoid axles, the new axle construction - designed for a payload of 11.5 tonnes - also offers additional ground clearance of approximately four centimetres. This means MAN now achieves the ground clearance required for N3G approval (off-road vehicle) with 315/80 R 22.5 tyres fitted.

The new axle unit is available for vehicles up to 480 hp in normal height design for leaf-leaf and air-leaf suspension versions of the TGX 6x4, TGS 6x4 and 8x4. This also includes the TGM in 6x4 drive configuration. The TGX 6x4 and TGS 6x4 and 8x4 also benefit from this equipment alternative in the medium height version with leaf-leaf suspension. The new tandem axle provides a transmission of $i = 2.85$ to ensure an efficient drive train. The widest ratio offered to date was $i = 3.08$.



Extra high payload: light TGS truck mixer chassis.

The permissible weight for four-axle vehicles in Germany is 32 tonnes. The greater the payload the chassis provides, the more concrete can be charged into the drum. The four-axle MAN TGS 32.400 8x4 BB is specially designed for this purpose – with no compromise made in terms of driver and passenger, efficiency and suitability for the industry. The MAN chassis meets the sector requirements exactly: a weight optimized frame made of high-strength steel, a lightweight but powerful 400 hp engine combined with the MAN TipMatic automated gearbox, and a wheelbase of 2505 mm between the second and third axles ensuring compact vehicle dimensions and optimal manoeuvrability both in traffic and on the construction site. It also includes a uniform set of tyres in 315/80 R 22.5 format all round on aluminium rims, tanks for 300 litres of diesel and 35 litres of AdBlue, a spacious and clearly arranged M cab and a partially raised Euro 6 exhaust system behind the cab. Thus the chassis weighs 9,065 kilogrammes without driver, the fuel tanks filled up with 10 %.

Construction flagship: the MAN TGX with D38 engine

MAN is showcasing the powerful D38 engine in the TGX series for the first time at bauma. This combination represents the perfect vehicle for heavy-duty traction operation. With high engine power over 500 hp, you can transport heavy loads and at the same time achieve high speeds. Typical applications include tilting articulated trains or 6x4 tippers frequently used with trailers. In construction traffic, for example, if low loader trailers with heavy-duty construction machines need to be pulled, then the TGX D38 with 520 and 560 hp can move up to a gross train weight of 120 tonnes with ease - depending on the driveline design. In line with sector requirements, MAN is adding the TGX D38 in normal as well as in medium design heights and with tough steel bumpers to the product range.

The two-stage turbochargers, characteristic of MAN engines, mean the 6-cylinder in-line engine with 15,256 ccm displacement reaches its nominal torque of 2700 Nm at 930 rpm. With its wide engine speed range, full torque is available from 930 to 1350 rpm. This means that in traction applications, this top-of-the-range model generates great tractive power from the torque, changes gear at an early stage and maintains high engine torque in high gears.

In summer 2015, MAN switched over the TGX D38 series to the new TipMatic TX gearbox generation. Its direct-drive version is designed for the high torque of 2500 to 2700 Nm produced by the D38 engines. This TX



gearbox provides the customer with a number of convenience functions. The following functions from the catalogue are particularly suited for use in the construction industry:

- Gradient sensor: Thanks to the integrated gradient sensor, the TGX D38 takes the current topography into account when selecting a gear. The TipMatic TX always finds the right gear for moving off – whether driving uphill, with an empty vehicle or with full loads.
- Rock-free: On a snow-covered carriageway for example, or on lightly compressed ground on construction sites, this function on the TGX D38 makes it easier for trucks which are stuck to pull away. If the rocking free function is activated, the clutch opens very quickly, if the driver has lifted off the accelerator. If the accelerator is pressed again, the clutch closes, allowing the driver to carefully rock the vehicle free. A suitable gear is selected automatically here in order to reduce the torque to the drive wheels and thus avoid wheel spin.
- Manoeuvring feature: The interaction between the accelerator position and clutch controls has been designed to function even more smoothly so that the driver can, for example, manoeuvre more accurately at the loading ramp or in confined construction sites.

Fuel saving is the aim of other functions available on the TipMatic TX gearbox. This makes a positive contribution when reviewing the TCO of the MAN TGX D38. The new EfficientCruise GPS cruise control with EfficientRoll “sailing” function was added to this series along with the TipMatic TX. The combination of both factors provides additional savings. The system utilises the 3D map material of the terrain to anticipate the course taken by the road and adapt the speed accordingly. At the same time, EfficientCruise anticipates gear selection and shifts down at the right time into the appropriate gear before uphill sections. The aim is to negotiate the uphill section without tractive force interruption. The vehicle prevents downshifts entirely on short inclines if possible. With the knowledge of the topography of the course of the road ahead, the vehicle shifts up a gear at an early stage at the end of an incline if this is likely to have a positive effect on fuel saving. This is where the speed shifting functions play their part. Thanks to the specific coordination of engine, clutch and gearbox control, it shifts even more quickly between the three highest gears – 10th, 11th and 12th. This means, for example, that the gearbox can shift down more quickly when going uphill and the torque for tractive force interruption is shortened. This in turn means that greater momentum is maintained, saving the vehicle's fuel.



The EfficientRoll sail function automatically shifts the gearbox to neutral on gentle downhill slopes. The disengaged engine runs at idling speed. Due to the reduced drag losses, the vehicle loses speed less quickly than with a gear engaged. If the vehicle drops below the set cruise control speed or exceeds the set speed, a suitable gear is automatically selected and the clutch engaged.

The Idle Speed Driving function uses the high torque of the 15.2 litre engine at the lowest speeds which provides greater comfort when driving slowly and saves on fuel. This is particularly practical in stop-go traffic or for precision manoeuvring. In such situations, the vehicle will continue to move forward with a lower idling speed of approx. 600 rpm and the clutch closed, as long as the driver does not brake.

For the heavy load: MAN TGX heavy-duty transporter

The MAN TGX with D38 engine provides top performance for heavy-duty transport. The four-axle MAN TGX 41.640 8x4/4 combines the most powerful version of the D38 engine and the MAN TipMatic TX with the standard converter-clutch unit. This combination increases the input torque from 3000 Nm to 4700 Nm. As a result, even the most heavy duty transporters move off smoothly but powerfully. The converter-clutch unit enables particularly precise manoeuvring of the vehicle in tight spaces, on inclines and with heavy loads.

The combination of the MAN TipMatic 12 gear automated gearbox with the converter-clutch unit and the TurboEVB continuous braking system with Intarder is specifically designed for heavy duty applications. It allows MAN heavy-duty tractors to drive with power, low fuel consumption and low wear. The combination of the TurboEVB and Intarder provides brake output of up to 900 KW over a very wide range of speeds.

The launch of the MAN TGX D38 was the reason to extend the range of models in the heavy-duty transport segment. As regards cabs, there is a choice between all widths XL, XLX and XXL, and now also as right-hand drive ex-works.

Important for heavy-duty transport operators: The wheelbases on the new Euro 6 version with the D38 engine are the same as the current Euro 5 design with the V8 engine. This means that the dimensions and the cornering characteristics of the towing vehicle remain the same. The existing reports continue to be valid without alteration.



In addition to the premium 640 hp class, MAN is adding further models to the product range for heavy-duty transport. Gross train weights of up to 180 tonnes are possible with the 560 hp and 2700 Nm D38 engine.

Efficiently moving ahead: Top torque for all MAN TGS and TGX with D26 Engines

For the first time at a construction trade fair, MAN will present the updates made to its entire TGS and TGX series engine portfolio for IAA 2014. Top Torque, the electronic torque enhancer, is a new fuel saving technology and has been added to all D26 engines. The engine's power train manager provides increased torque of 200Nm in both the higher 11th and 12th gears. Thanks to the higher pulling power, the driver is able to drive for longer in the higher gears. This saves changing down the gears and reduces tractive force interruption on slight inclines. This results in positive effects on transport efficiency including reduced fuel consumption, increased average speeds and improved driving comfort.

Available ex-works: 5-axle vehicle meets sector requirements

Some markets are increasingly turning to five-axle chassis for large tippers, truck mixers, concrete pumps, crane vehicles or ejector vehicles. Country-specific legislation is often the key factor in terms of vehicle and axle weights. In the TGS series, MAN supplies the 10x4-6 variant in a compact design which benefits manoeuvrability. MAN has installed a steered and lifting trailing axle to support this. The two wheelbase variants available differ in the spacing between the second and third axles. The spacings are 1795 + 2050 + 1400 + 1450 millimetres and 1795 + 2505 + 1400 + 1450 millimetres. MAN has installed a partially raised exhaust system for the optimal use of space between the axles for frame components such as diesel and AdBlue tanks, battery boxes and compressed-air tanks. This vehicle design enables increased manoeuvrability at a maximum gross permitted weight of 50 tonnes.



Tailored to the sector in every respect: partially raised exhaust system

MAN offers four and five-axle chassis from the TGS series with a two-part exhaust system. The diesel particulate filter is fitted between both front axles, and the SCR-cat is positioned on a frame behind the cab. The extension to the variant range is new for bauma 2016: This version is now also available with the 8x4 drive in combination with the longer L and LX cabs.

The advantages of this arrangement are the avoidance of dust turbulence with an exhaust tailpipe which discharges downwards, and the increased space provided on the frame between the second and third axles. This free space can be used for a larger fuel tank or for additions needed by the body. Alternatively, a vehicle with a shorter wheelbase may be chosen which increases manoeuvrability.

Practical features: LED tail lights, paver brake, turning brake

Often, only the small details make the driver's life easier, increase the operational life and therefore pay off in terms of total cost of ownership. The tail lights using LED technology are an example of this. These are less sensitive than traditional bulbs to vibrations which constantly occur on unsurfaced routes. They also have a longer service life with lower energy consumption.

If the tipper is supplying tarmac to the road paver, the so-called paver brake assists the driver. It supplies a minimal brake pressure to the rear axle so that the truck can be pushed along by the road paver, but does not roll away by itself.

The turning brake increases the off-road manoeuvrability of three or four-axle vehicles with a rear tandem-axle assembly. A selective braking intervention on the rear axle wheels on the inside of the corner reduces the cornering radius.

A tough operator in mining: MAN TGS WorldWide

For mining and gravel extraction operations, MAN offers the tough and resilient MAN TGS chassis from its WorldWide product family in markets outside Europe. The vehicles are optimised to meet sector requirements: The tandem axle unit on the MAN TGS 33.480 6x6 BB exhibited at bauma has a longer wheelbase of 1500 millimetres. This means that large format



16 R 20 tyres can be fitted. For extremely challenging ground conditions, 24 R 20.5 tyres can also be fitted to the rear axle. The MAN TGS dumper truck, designed for a gross permitted weight of 33 tonnes, is therefore ideal as an alternative to specialist vehicles such as the articulated dumper which is significantly more expensive to purchase.

The MAN TGS WorldWide, designed by the Munich-based commercial vehicle manufacturer, is a truck for tackling and dealing with extreme challenges. These include challenging road conditions, extreme climatic conditions such as icy temperatures, snow and extreme heat. The heat retention function of the coolant, which remains active in neutral, has proven itself in Arctic climatic regions and in frosty winters. It ensures the operational capability of the vehicle in temperatures of up to minus 40 °C.

The MAN TGS 40.540 6x6 BBS from the TGS WorldWide series is available for the toughest of transportation tasks. The combination of the three-axle towing vehicle with 540 hp engine, MAN TipMatic automated gearbox with converter-clutch unit (WSK), leaf-sprung planetary axle and additional radiators for engine, gearbox, WSK and transfer case is ideal for gross train weights of up to 250 tonnes at maximum traction. This vehicle is designed for worldwide operations. The variant range includes left and right-hand drive vehicles and is available in emission categories Euro 4 and Euro 5. Air intake as well as exhaust tailpipe are raised for rough operating conditions. A tough steel bumper is provided and tyre formats 325/95 R24 and 14.00 R20 can be selected. Heavy duty equipment ex-works is a tradition at MAN. Components such as two-stage trailer hydraulics, front register coupling, heavy-duty trailer coupling at normal and low mounting positions, sliding device for fifth-wheel coupling and support plate for swan neck can of course also be supplied by MAN with this towing machine.

The Euro 5 exhaust classification is increasingly gaining in importance in markets outside Europe. MAN is therefore introducing common rail engines from the D20 and D26 series for the first time to the TGS Worldwide series in this exhaust classification. These come from the D20 engine series with 320, 360, 400, and 440 hp. The D26 covers the 480 hp and 540 hp versions. All the engines are 6 cylinder in-line engines.