In the spring of 2006, MAHA and Robert Bosch GmbH signed a cooperation agreement in the area of automobile testing technology. The goal of this collaboration is the joint development of new test equipment as well as expansion of the general inspection testing options. This will be in the area of mechatronics in the vehicle, a primary competency of both companies. Such mechanical-electronic devices will most likely be significant in future vehicle development for various areas of function, such as safety, drives, servers, etc.

An initial result of the cooperation is the possibility of equipping the MAHA EUROSYSTEM test line (primarily roller dynamometers) with the BOSCH KTS control unit diagnostic system. This combination provides the user with numerous advantages:
- Function tests of ABS (anti-blocking system), ESP (electronic stability program for vehicles) and similar systems are possible.
- Functional and connection tests of the ABS wheel sensors on the brake tester to prevent incorrect connections of the ABS control unit, for example.

The combination is possible in two variations:
- MAHA test line PC as the master for connecting the diagnosis units KTS 530, 540 and 570 from BOSCH or
- PC units of the BOSCH KTS 650 series as a main computer for the MAHA test line.

Performance Testing

The New MSR 1000 Top Roller Dynamometer

This newly developed all-purpose tester is also suitable for sport vehicles. Three characteristics indicate this directly. First of all is the equipment with two rollers on the tops of which the four vehicle wheels “ride” during the test procedure. This allows even low suspension cars to be tested, which are unsuited for testing on the usual dual roller dynamometers due to insufficient ground clearance. Secondly, the possible RPM range of the vehicle wheels corresponding to speeds between 0 and 320 km/hour is suitable for racers. And finally, the maximum testable performance of 155 kW (approx. 750 HP) per driven axle, i.e. 1500 HP for all-wheel vehicles. That, too, is far above the average performance for passenger cars.

The MSR 1000 is an extremely versatile all-purpose tester. On the “large” roller, the conditions for the tires are similar to those on the road. Vehicle testing with high load is possible for a long period, and thus it is particularly well suited for repair shops and testing facilities. Due to the inherent lack of positional stability for the vehicle during the testing procedure, there are a number of different holding devices available to immobilize the vehicle.

The characteristic drive-related key parameters can be measured: power, torque, and also traction force, each as a function of RPM or a discrete measurement at constant RPM. Other external measurement data can be displayed in combination. The type of display can be graphical (with curves) or numerical, with a wide variety of characteristics, units and representations selectable. The proven MAHA calculation and display programs and modules are used here, which are known for their general utility, simple operation, high operational reliability and good readability. The versatility of application is consistently enhanced by the ability to adapt to further vehicle-dependent factors: an adjustment range for wheel bases between 1900 and 3500 mm as well as dimensions for the axle spacing with a distance from roller top to roller top between 2200 and 3200 mm. Adjusting the test rollers for different vehicle types is quick, easy and reliable with hydralic controls.

The maximum traction force is 8500 N, the highest permitted axle load 2.4 tons. For customers, employees and friends

Counts on MAHA Products

TÜV Rheinland’s decision to install numerous MAHA products in March 2007 at its newly opened service station in Köln-Poll can be ranked as a direct reference for the MAHA brand. After all, TÜV can claim the highest level of skilled competence. In Köln-Poll, a modern building with 393 m² was created for vehicles up to 7.5 t. An extensive customer service plan will be initiated created with the suitable design and organizational prerequisites.

Following MAHA products are used:
- Two scissors lifts DUO-GN with axle play detector PNS (for front and rear),
- Motorcycle brake tester, model IW 10,
- Test lane Eurosystem CAR,
- Brake tester, model by 4 - 4-wheel drive,
- Motorcycle lift,
- Rail and joint play tester LAVS (for trucks),
- Pit safety,
- Headlight tester, model UTE3.

TÜV Rheinland has 132 test stations in Germany with additional service stations in France, Spain, Latvia, Argentina and Chile.
MAHA is Looking for Young Engineers!

If you, the reader, feel the urge to “answer the call”, then contact us about the possibility of working at MAHA, where you can be a part of excellent compensation and a location in the magnificent Allgäu region, a favored vacation destination for others.

Although we can educate commercial specialists in our training department, this, of course, not the case for engineers.

Technical details and advantages of this new MAHA performance dynamometer MSR 1000 are described more closely in the magazine edition at hand under the title “The New Top Roller Dynamometer MSR 1000”. And it should be noted that it is now in use at ABT Sportsline GmbH, Kempten. This internationally recognized tuning company made the decision to buy another product from MAHA which we consider an excellent reference.

As described above, this modern dynamometer is particularly suited for sporty vehicles, in effect exactly those vehicles which ABT Sportsline “treats”.

Not to forget either is a technical specialty particular to this dynamometer. The test roller surface for the tires’ “good Grip” - a set-up as is common - a ground pattern in the roller material. As durability improvement, a metal alloy has been flame-sprayed (a known thermal procedure). By doing so, normal road conditions can largely be simulated. Another improvement!

MAHA is looking for young engineers! It has a strong interest in such graduates, primarily from the departments of Mechatronics, Mechanical engineering at technical colleges, as do numerous other companies manufacturing technical products. Compared with the demand, there are currently too few of these engineers. On the other hand, we need help with all activities associated with innovations. Theoretical subject expertise is urgently needed for this.

In the beginning, the electronic parking brake was used primarily in medium and top models for special test stands. In the meantime, this conventional brake system has become popular in economy vehicles.

MAHA brake testers of the IW2 model series now have the equipment option of a newly developed MAHA system for testing the effectiveness of the electronic parking brake. If one wants to test the effectiveness of this parking brake for its actual purpose - parking - then that can only occur functionally when the vehicle’s wheels are motionless. Furthermore, with certain vehicles, the actual parking brake is only activated when the vehicle is at a standstill.

The function of all brake systems is largely the same:

If the parking brake is actuated while the vehicle is still in motion, the service brake is activated first. The actual parking brake on the near side is only applied after the vehicle has come to a complete stop. A test of effectiveness for this brake system is thus not possible under “standardized conditions” on the brake tester!

According to the new MAHA test method, the roller tester is only started after the parking brake on the vehicle is actuated first. The initial braking torque of the test roller is measured and used as a measure for the action of the parking brake. To accomplish this, the system has a special, innovative motor controller which is capable of a slow start of the test roller drive with full torque. Furthermore, the slipage between the tires and the test roller is monitored so that the roller drive can be switched off in time to prevent wear damage to the tires.

The company has submitted a patent application covering this new measurement method and the associated electronic systems.

New: Testing of Electronic Parking Brakes in MAHA IW2 Brake Testers
**Mobile Column Lift RGB – especially for Buses**

The joint use of four individual mobile columns each with a load capacity of up to 3.5 t means these kinds of vehicles can be lifted.

The lifting system is particularly efficient (over 90%) through the use of a recirculating ball nut and screw. Slim, variable column design. The basic frame design makes for easy maneuverability of the lift even in tight spaces and requires limited space for storage.

Mobile columns can be moved to the vehicle and not the vehicle to the lift. Vehicle work can be done at various locations. Stands can be placed underneath the vehicle freeing up the mobile columns to be used on other vehicles.

**Product advantages:**
- No-master column, no separate power supply unit
- Each column with its own electromagnetic drive
- Automatic synchronisation is standard
- Control with function selection: joint, single or group operation
- Electronic switch-off in end position, safety monitoring and travel measurement by non-contact inductive sensor
- Low basic frame height of 128 mm
- Kilogram columns, each with a low dead weight of 360 kg
- Carriage with fixed wheel forks for tires 8.25 to 12.00-20/12 R 22.5.

**Features and advantages of this system are:**

- User friendliness.
- Reliability for the workshop. Its price is competitive - reliable for use in the workshop. Its price is competitive.
- Important - reliable for use in the workshop. Easy to handle and - most importantly - safe.
- Exceptional design (size of a shoe box) and therefore easy to handle and - most importantly - safe.

**Device for Precise Particle Measurement in Diesel Engine Exhaust Gases**

We have developed the new MPM-4 measurement unit (Figure 1) for this purpose. Its high measurement accuracy is a distinguishing feature. "MPM" stands for diesel particle measurement system. It is extremely small (about the size of a shoe box) and therefore easy to handle and - most important - reliable for use in the workshop. Its price is competitive with traditional exhaust gas measuring equipment. This innovation also demonstrates our capacity for development for general vehicle inspections, which is a part of our future objectives.

The measurement procedure analyzes the exhaust flow. The particle concentration is displayed as mg/m³. As a result of many years of development at MAHA, a principle of measurement and a device have been produced which can detect very small particles (smaller than 0.001 mm) in the exhaust flow with sufficient accuracy, determine their concentration and display the result by electronic processing. In the principle applied we combine the measurement of opacity of the exhaust gas with the detection of these tiny particles using lasers. The greater precision and reliability has been proven in comprehensive series of tests. Already in 2004 we had a concept study on the measurement of fine particulates in diesel exhaust. We used the time after that to create an optimal instrumental implementation with superior user friendliness.

The effective, precise detection of fine particulates in the emissions of diesel engines, which are common in vehicles today, serves to protect human health on one hand. Recognized exposure limits for damage to health can now be stipulated. On the other hand, only in this manner can the statutory limits - which may become stricter in the future - be measured. The basic principle that only accurate measurement results allow meaningful evaluations also applies here.

Diesel engines in newer vehicles (not just passenger vehicles, but also the large number of trucks and other commercial vehicles) usually have inherently lower emissions. The posterior emission quality of older engines or the effect of particle filters can now be shown more precisely than before. It has been found that the emission values of engines can be reduced by up to 80% with good maintenance and that properly working filters remove more than 95% of the particles generated. Proving such qualities is now easier with the MPM-4.

The MPM-4 from MAHA is thus not only an effective measuring unit for the current evaluation of individual engines, but also demonstrates our capacity for development for general vehicle inspections, which is a part of our future objectives. The MPM-4 has been developed in cooperation with leading manufacturers and has been tested extensively in various customer vehicles. The basic principle is also demonstrated in the mobile version of the MPM-4.

**Mobile Column Lift RGB – especially for Buses**

The model name says it all: the main component is made of aluminum instead of the more commonly used steel. Railways, traverses, and posts are aluminum made.

The precision aluminum extruded profile is anodized and joined together with bolts only giving the lift a high-quality, impression look. The lift is suitable for special applications such as used car evaluation, vehicle delivery, or wheel alignment and other common workshop tools.

**Product advantages:**
- Advanced corrosion resistance
- Reduced dead weight of the lift of ca. 250 kg in comparison to a comparable steel version, lowering the energy consumption for the electro-hydraulic drive bringing with it advantages for transport and installation
- Reduced drive-in height
- Standard delivery equipped for precision wheel alignment with a lowering device made-up of lock ladder and latch

**You can find us at the following exhibitions:**

**National exhibitions:**
- Testing Expo Stuttgart 08.05. - 10.05.07
- Werkstatt Sudwest Sindelfingen 06.2007

**International exhibitions:**
- AUTOPROMOTEC Trade Fair Center, Bologna, Italy 23.05. - 27.05.07
- Poznan Motor Show Poznan, Poland 09.05. - 13.05.07
- MOTORTEC Madrid, Spain 09.05. - 13.05.07
- Truck Show Las Vegas Las Vegas, Nevada, USA 07.06. - 09.06.07
- AUTOZACON Brno, Czech Republic 09.06. - 14.06.07

**Measurement Technology**

**Device for Precise Particle Measurement in Diesel Engine Exhaust Gases**

Measurement and display unit of the newly developed Diesel Particle Measurement System (MPM-4).

Handy, easy-to-handle, reliable for the workshop.
Maha has entered into a joint venture with TachoControl Semmler GmbH in Göppingen, Germany leading to the establishment of Tacho Control DATA GmbH, also in Göppingen. As its name suggests, the new company is involved with tachographs of a new generation (see the article “Data from Digital Tachographs in Commercial Vehicles” in this issue).

Ralf Semmler and Michael Kroenig have been appointed managing directors of TachoControl DATA.

Data from Digital Tachographs in Commercial Vehicles

Since May 2006, an EU regulation requires that all newly registered vehicles with a permitted total weight exceeding 3.5 tons as well as buses with 9 seats or more throughout Europe be equipped with digital tachographs. There are several known providers of these units on the market. These digital devices are to replace the previous analog ones in stages.

However, more is necessary than just digitally recording the data for the driver and vehicle. Just as important and also required is the storage, evaluation and archiving by the registered vehicle owner, for example. In this regard there are legally defined tasks for the driver and commercial user or owner. MAHA is also active in this area: with testing and calibration of these tachographs with an additional measuring of the TCS/TC-net series on commercial vehicle brake testers on one hand, and with service for the complete organization of data processing by TachoControl DATA GmbH in Göppingen, Germany on the other.

To cope with the increasing complexity of this new development, the organisation and installation of the relevant undefined data transmission from the vehicle to the registered owner.

Advantages of the FCD system

The concept system works with a download key with 64 MB storage capacity. The driver car- ries it with him. It holds all the systems on the vehicle. The data is downloaded from the key to a PC using a USB adapter or via a special terminal for that purpose - which is the special technical advance. From there one can download and transmit the data to a third party, either to TachoControl DATA GmbH or to MAHA for evaluation. Of course, the data remains the property of the vehicle owner.

Lifting devices for various designs that fit in the shell as well as lifting devices of various designs that fit in the shell as well as lifting devices of various designs that fit in the shell can be applied for at the responsible agency. The so-called driver and company card, which consists of several components:

The TachoControl DATA system (TCD system) can be applied for at the responsible agency. It includes the so-called driver and company card, which consists of several components:

- Digital driver card
- Terminal
- Download key
- Download cable
- USB adapter

The components are a long floor channel in which there is a foundation shell as well as the so-called driver and company card, which consists of several components:

- Digital driver card
- Terminal
- Download key
- Download cable
- USB adapter

TachoControl DATA: a New Joint Venture - with MAHA

It is more a modular system for repair shops and less the individual devices or equipment. It shows that we are a system provider that thinks a step ahead and not just a maker of single products. It is our goal to keep shop processes flexible for years to come. The main part of this MAHA system is a long floor channel through repair shops, in which individual vehicle lifts are arranged. These lifting devices can be positioned in any way in the floor channel and adapted to various requirements. The requirement for flexibility in a workshop can have several causes which cannot always be planned in advance: changing levels of shop utilization, work situations and workforces requiring, adaptation, changes of vehicle design in the future and also the option of investment in stages.

The components are a long floor channel in which there is a foundation shell as well as the so-called driver and company card, which consists of several components:

- Digital driver card
- Terminal
- Download key
- Download cable
- USB adapter

The TachoControl DATA system (TCD system) consists of several components: the so-called driver and company card, which can be applied for at the responsible agency, the actual tachograph as well as the suitable download devices for it and corresponding evaluation software. The driver and company card must be inserted in this auxiliary device in the vehicle (about the size of a car radio) in order to meet the applicable statutory requirements for reading the data. Driving times and rest periods must be read from the digital driver card and read at least every 3 months from the vehicle unit and be transmitted to the registered owner.

The distinguishing features of this new development are the organisation and installation of the relevant undefined data transmission from the vehicle to the registered owner.

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