

Testing the quality of overhauled vehicle engines

In many cases, worn-out vehicle engines, mainly of trucks and busses, are overhauled instead of being scrapped. Of course, an overhauled engine should be as good as a new one, i. e. it should have the same technical properties, in other words, the same quality.

This quality can be ensured best by subjecting the overhauled engines to a power test, where the engine is loaded by a dynamometer and at least the maximum power and/or the maximum torque are measured at one or more rotational speeds. The specific fuel consumption, an exhaust gas analysis, the blow-by, and the correct functioning of the control equipment (ignition, injection, electronic motor management etc.) can be further subjects of power tests. In case overhauling is performed by the manufacturer, the engines are normally tested after overhauling in the same manner as the newly produced engines.

However, a remarkable number of engines is not overhauled by the manufacturers or large overhauling plants, but rather by smaller, independent companies or workshops of organizations operating big fleets of vehicles, e. g. public transport organizations. They want to ensure the quality of their overhauling works by performing the same final measurements as the big overhauling facilities. Consequently, they also need an engine test bed. But their technical and economic preconditions are quite different:

The number of engines to be tested is much lower, in extreme cases only one engine per several days.

The number of different types of engines to be overhauled by an overhauling workshop can be as small as at an engine manufacturer's plant, e. g. in a specialized overhauling shop, or if a fleet is equipped uniformly; but for other workshops it can be practically unlimited.

Despite these preconditions, the expenses for every power test shall not exceed the amount incurred by a manufacturer for utilizing his testing plant.

In order to reach this objective

the total investment for a test bed must be much lower than for a test bed in the testing plants of big overhauling facilities,

the life must be long,

the maintenance costs must be low, and

the expenses for personnel must be low.

Furthermore, a test bed for small overhauling workshops should be suitable for different workshop organizations with small or high numbers of different types of engines to be overhauled.

Engine test beds (dynamometers)

MP 80 ... MP 2x400 SP of WEINLICH meet these requirements to an extent that has been unknown before:

Total Investment

Total investment is restricted to the price of the dynamometer itself and to an electric wall outlet. The dynamometer does not require a foundation or installations for cooling water. Training of personnel is normally not required thanks to easy operation.

Life and Maintenance

The life is practically unlimited because only the roller bearings are subject to wear. They can be easily replaced. In practice, however, this is usually not necessary because of the very long life of the bearings when used in the dynamometer.

If the test bed is not used, the air cooled eddy current brake contained in the dynamometer is not endangered by frost or corrosion as would be the case with water brakes and water cooled eddy current brakes.

The equipment has no cooling system which would require protection against frost or corrosion, or water conditioning to ensure the chemical quality of the water.

Maintenance is restricted to lubrication of the roller bearings in the brake and of the cardanic shaft connecting the dynamometer with the engine to be tested.

Personnel costs

Thanks to the easy operation, every employee can make the power test. No specialist is required.

Flexibility

Thanks to the mobility of MP 80 ... MP 2x400 SP, they can be easily adapted to varying situations in the workshop as described below:

If there is only a limited number of types to be tested but with remarkable numbers per type, WEINLICH offers truck construction kits RWB suitable for assembling mobile engine supports for maximum engine weights of 300 kg up to 800 kg. These engine supports can be equipped with all accessories necessary for running the engine. So a certain truck can be prepared for a certain type of engine and preparing every engine of this type for power test needs a minimum of time.

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If there are many different types of engines to be tested, WEINLICH offers a supporting frame to be transported by a pallet truck for an engine weight up to 2000 kg. Vertical and horizontal position of its supporting columns are easily adjustable, even with mounted engine.

Both, the supporting truck RWB or the universal supporting frame, with mounted engine, can be moved to the dynamometer and then the engine and its support are quickly and easily connected to the dynamometer.

If the engines shall be turned in cold state before firing, a separate cold driving unit can be supplied. It can also be moved by a pallet truck. Connection of the engine and its support to the cold driving unit is as easy as to the dynamometer.

So every engine can be mounted on the appropriate supporting system, either specialized truck RWB or universal supporting frame, then maybe moved to the cold running unit or vice versa for driving without firing, then it can maybe run idle and finally it is moved to the dynamometer for power test. After power testing the support is removed from the dynamometer for dismantling the engine.

Hence, mounting and preparing of the engine for the power test and removal after the test do not occupy the dynamometer.

Further Features

Engine test beds (dynamometers) with air-cooled eddy current brakes are distinguished from water brakes and water-cooled eddy current brakes by the fact that they can be loaded with high power for short times only. This possible disadvantage is compensated for by the evaluation, display and control unit with the computer MP by which every desired state of the engine can be adjusted very easily and quickly thanks to the handy method of operation proven for many years. A simple test report printing feature facilitates and speeds up the power test. Even the gravimetric determination of the specific fuel consumption only requires a short time thanks to the precision of the electronic balance connected to the MP computer and to automatic printing of the result.

As a result, the efficient performance of power tests provided by engine test beds MP 80 ... MP 2x400 SP also reduces the expenses for power testing.

The test report is printed automatically. It is protected against falsification and forms the basis for the internal quality assurance system, and provides evidence of quality to the customers.