

Condition data are **only a part of the influencing variables** that lead to the measures required for maintenance and construction and determine the allocation of resources. In this manner, for example, the **pavement construction**, previous partial maintenance measures, type and **extent of traffic density** and **safety-relevant data**, etc. are also taken into consideration.

All the data flow together into the **Pavement Management System (PMS)** and facilitate objective decision-making regarding the **scope and urgency** of the present pending construction and maintenance measures. Since the PMS enables well-founded **prognoses**, it is the prerequisite for long-term **maintenance management**.

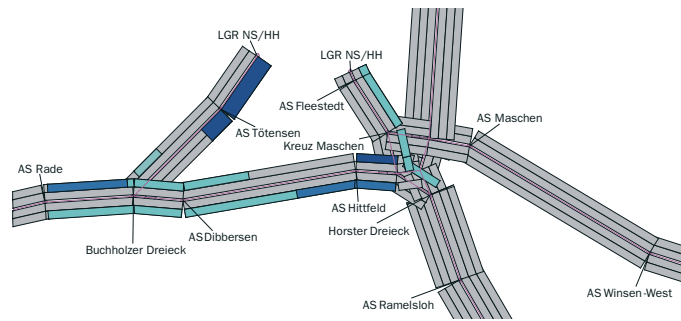
Maintenance management that is based on **objective and current data and takes all relevant parameters into account** is presently indispensable if:

- The **safe condition** of the highways and their associated structures (e.g. bridges and tunnels) has to be guaranteed over a **long period of time**,
- **Changing traffic patterns and densities** must be recorded in real time and taken into account,
- **Traffic disruptions** owing to construction work and maintenance measures **must be minimised** and
- an **optimal cost/benefit ratio** must be achieved.



Systematic Road Maintenance

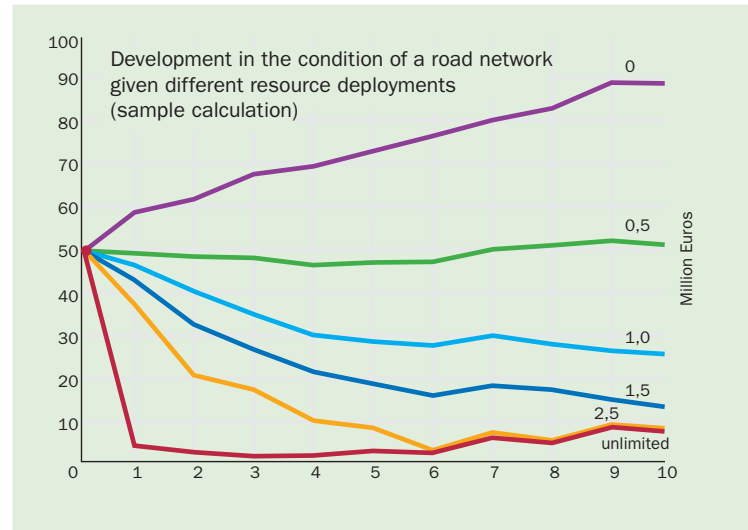
Road Monitoring
Maintenance planning
Implementation



Planning maintenance measures at the network level; Maintenance objectives and strategies



Implementation of maintenance measures



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Road maintenance

The German trunk road network is **substantially used and burdened** owing to its central location within Europe. Its maintenance becomes an urgent task not only on account of **traffic safety aspects**.

The objective is to deploy the resources provided optimally and to maintain the roads at a high level of safety over a long period of time.

These objectives can only be met by **systematic maintenance management** based on objective measurement data.



Evenness measurement device for analysing carriageway surfaces: 41 laser sensors scan the carriageway surface longitudinally and transversely, detecting the slightest unevenness.

The unevenness detection lasers cover a carriageway width of up to 4 m.



Damages and wear are particularly dependent on **weather conditions** and on the **traffic density** and are thus, not the same on all federal trunk roads.

Road Monitoring ...

The condition of the roads must thus, in the first instance, be recorded continuously and evaluated using a standardised procedure.

The criteria, that reflect both the condition of the construction and also the safety aspects, are the **transverse and longitudinal unevenness, skid resistance, and the substance (surface damages)**.

Data are acquired by means of **special measurement vehicles in regular traffic**:

Longitudinal and transverse unevenness are obtained with the help of an evenness measuring vehicle by means of **scanning** the carriageway surface using a **laser**. Skid resistance is derived from the **frictional forces** on a measuring wheel. Substance (surface damages) is documented using a continuous **video recording**.



High-speed skid resistance measurement system:

Measurements are made at constant speed and a defined water application rate.

The frictional forces occurring at the measurement wheel provide information regarding the carriageway's skid resistance.

... and assessment



The measurement vehicle for recording the substance (surface damages) detects surface damages, such as, for example, cracks and patches.

The **condition data** recorded in this manner lead to a uniform **evaluation** on a federal level whereby grades from 1 = "very good condition" to 5 = "measures urgently required" are assigned. Different colours on maps clearly indicate the condition of the roads.

Condition in the road network

