

INTRODUCING THE ORGANIZATION OF TRANSPORT STUDIES

Bundesanstalt für Straßenwesen (BAST) Federal Highway Research Institute

Petra PETER-ANTONIN & Iris SCHNEIDERMANN

Public Relations, BAST

The Federal Highway Research Institute (Bundesanstalt für Straßenwesen - BAST) in Germany is a technical and scientific institute subordinate to the Federal Ministry for Transport, Building and Housing (Bundesministerium für Verkehr, Bau- und Wohnungswesen - BMVBW). Its remit is to promote development of roads and related fields and to provide the BMVBW with scientifically sound data to assist the decision-making process for issues relating to transport policy in these fields. The tasks range from answering enquiries at short notice to co-ordinating and conducting research projects lasting several years.

The BAST's aims are to improve the cost-effectiveness of building and maintaining federal trunk

roads and their structures, increase the safety and efficiency of road transport, reduce the environmental impact produced by road traffic and road construction and improve the efficiency of the overall transport system. To support the BMVBW, the BAST is involved at the national and international level in drawing up regulations and standards in all fields related to roads.

The BAST's work began in 1951 with research into road construction. In 1965 it was commissioned to expand its remit beyond road construction and also work on increasing traffic safety and the efficiency of the roads. In 1970 the German Bundestag passed a resolution designating the BAST as the central agency for accident research.

LARGE-SCALE TEST FACILITIES

Since 1983, the BAST has been located in Bergisch Gladbach-Bensberg near Cologne. In the grounds, which cover approximately 20 hectares, there is an office complex as well as ten test halls with large-scale test facilities, some of which are unique: with its Vehicle Engineering Test Facility, the BAST has an accredited test laboratory for conducting Euro NCAP (European New Car Assessment Programme) crash tests. Tests are also carried out here to improve active vehicle safety, and impact tests are conducted on elements of road equipment. The interior drum testing facility enables the friction between tyres and roadway to be tested under different atmospheric conditions. On the rotating test facility, the BAST, under commission to industry, tests roadway marking systems before they are used in practice. The lighting engineering hall is 112 metres long and can be completely darkened, allowing night-time traffic situations to be simulated and many tests to be carried out with full-scale conditions. Acoustic readings for noise protection are carried out in the BAST and include the use of models of traffic structures and the residential structures surrounding them. With a scale of 1:20, surfaces of 200 × 200 metres can then be simulated on a 10 × 10 metre model surface. A road has been installed at a scale of 1:1 in the hall for dynamic investigations. The load-bearing behaviour of dif-



Fig. 1 Federal Highway Research Institute (Bundesanstalt für Straßenwesen – BAST)



Fig. 2 Rotating test facility



Fig. 3 Hall for dynamic investigations

ferent construction methods and construction substances is investigated here using time-lapse techniques and a simulated traffic load. In only four weeks, it is possible to simulate the load of a busy road over a period of 25 years.

RESEARCH AND QUALITY ASSURANCE

The BAST uses its test facilities to carry out its own research work when there are issues of particular importance. The BAST conducts approximately 300 of its own research projects per year, and increasingly also conducts projects and investigations commissioned

by the European Union. It also coordinates more than 300 projects carried out by external scientists.

In the field of safety research in road traffic, the BAST plans and coordinates research to meet the respective aims and objectives, and tests the efficiency of measures designed to increase traffic safety.

The BAST's tasks also include providing advice and expertise. In addition to this, the Federal Highway Research Institute evaluates the quality of services and assesses the quality of products on its large-scale test facilities and in its laboratories. This includes conducting accreditations, inspections, certifications and approval and homologation procedures as well as holding courses of training.

COOPERATION

The BAST cooperates in most of its fields with other research agencies from Germany and abroad, in particular with the countries in the European Community. International exchanges of experiences and participation in international organisations are becoming increasingly important. The scientists at the BAST are involved in over 20 international organisations, including PIARC (World Road Association) and the OECD (Organization for Economic Co-operation and Development). At the European level, the main bodies in which the BAST is active include FEHRL (Forum of European National Highway Research Laboratories), FERSI (Forum of European Road Safety

Research Institutes) and EuroNCAP (European New Car Assessment Programme).

INFORMATION AND EXCHANGE OF EXPERIENCES

The BAST publishes the results of its work in two publication series; abstracts of the work are published in “Scientific Informa-



Fig. 4 Crash in the vehicle engineering test facility



Fig. 5 Bridges and structural technology

tion“ and on the Internet under www.bast.de. The BAST research is also documented in ITRD (International Transport Research Documentation), an international information database which has existed since 1972. Workshops, conferences and congresses take place regularly in the BAST to maintain the exchange of experiences with other experts – at both national and international level.

The BAST’s annual budget is approximately 30 million Euro and it now has over 400 employees.

AREAS OF RESPONSIBILITY

The BAST’s tasks are divided into five technical divisions and the administrative services division:

- Highway construction technology
- Bridges and structural technology
- Traffic engineering
- Automotive engineering
- Behaviour and safety in highway traffic
- Administrative services

Highway construction technology

High axle loads and ever greater volumes of lorry traffic are placing an increasing strain on the roads. Pavement construction and maintenance methods must therefore be improved technically and as regards cost-effectiveness. High-quality natural building and recycling materials are to be used for this purpose. Noise-reducing road surfaces must continue to be improved, funds must be used in an optimal manner. This division

focuses on the following main areas:

- Fundamental issues of road maintenance
- Earthworks and mineral aggregates
- Concrete pavements, low-noise surface textures
- Pavement testing and design
- Asphalt pavements
- Chemistry, environmental protection and laboratory services
- European standardisation of highway construction

Bridges and structural technology

Bridges and tunnels are important elements on roads. The BAST works on developing procedures to improve durability and cost-effectiveness and conducts research in order to recognise damage in time, use targeted measures to repair the damage and then take the findings into account in the construction of new bridges and tunnels. This division focuses on:

- Concrete structures
- Steel structures and corrosion protection
- Tunnel engineering and operation, foundations
- Maintenance of engineering structures

Traffic engineering

Traffic engineering is caught between traffic demand and ecology. Roads must be designed safely and in an environmentally compatible manner, the existing road network must be used efficiently and traffic quality must be maintained by means of new technologies and concepts. Traffic signs should be easily recognisable, protection and

guidance devices should be safe and durable. The highway operation services should maintain the roads and ensure that traffic is safe. The aim must be to reduce the environmental impact made by traffic. This section concentrates on the following areas:

- Highway planning, highway design
- Telematics, traffic management
- Environmental protection
- Highway equipment
- Highway operation
- Traffic statistics, traffic operation and traffic control

Automotive engineering

Research focuses on the active and passive safety of vehicles. The BAST assesses modern technologies designed to assist drivers to cope better with complex traffic situations. Noise and exhaust emissions from motorised traffic should be reduced, environmentally compatible technologies should be improved. The central areas of this division's work are:

- Active vehicle safety, emissions and energy
- Passive vehicle safety, biomechanics
- Vehicle-pavement interaction
- Vehicle safety evaluation, driver assistance systems

Behaviour and safety in highway traffic

Despite a highly developed road network and modern safety systems, there will always be accidents. The behaviour and attitude of road users are the decisive factors in accidents. Risk factors and groups must be recognised. Safety

concepts must be developed for specific target groups and the effect of measures and training programmes tested. Consideration must be given to aspects relating to traffic medicine and traffic psychology, and the emergency services must be improved even more. The work in this division focuses on:

- Safety concepts, safety communication
- Accident statistics and analysis
- Traffic psychology, traffic medicine
- Driver training, driver rehabilitation
- Accreditation agency for bodies providing driving licence services

Administrative services

This division develops research programmes and coordinates the BAST's internal and external research activities. International cooperation with foreign organisations and institutions is becoming increasingly important. The research results are published in various media. The BAST's technical tasks must be supported via modern IT methods. Organisational, staff and budgeting matters must be coordinated. The main tasks of the administrative services division are:

- Personnel, purchasing
- Organisation, information and communication technology
- Budgeting, accounting, in-house management services
- External IT coordination, German Federal Highway Information System (Bundesinformationssystem Straße)
- National and international research management and cooperation
- Public relations, scientific information