Research and Development

Bilfinger Berger aims to create value through innovation. In its research and development work, the Group focuses on the continuous improvement of construction and services processes. In this way, we enhance the efficiency of planning and implementation. The development work is carried out by the operational units. Group Technology organizes and controls the orientation, content and scope of these activities. It is also actively involved in numerous research projects.

In 2007, our research and development activities led to a large number of approvals from building authorities, new patents and new registered industrial designs. In total, work was carried out on more than 50 research projects in the fields of construction, services and concessions. Once again, the focus was on:

- construction materials and measuring technology
- construction elements and structural technology
- repair, maintenance and operation
- process and machine technology
- tools for planning, knowledge and property rights

We cooperate with leading universities on selected research topics. These projects also aim to achieve direct benefits for our business operations.

Construction business

In our construction business, our research and development projects focus on optimizing lifecycle costs as well as on certain aspects of sustainability.

Together with universities and other academic institutions, industrial partners and state agencies, we have started a pioneering initiative entitled 'Resource-Efficient Buildings'. This initiative aims to develop energy-saving construction methods, electronic systems for measuring and assessing a building's condition, and concepts for the reduction of energy requirements in the operating phase.

In the analysis, assessment and optimization of the sustainability of real-estate properties, Bilfinger Berger's 'Building Pass' is increasingly gaining importance as a supplement to the German government's 'Energy Pass'. It offers an integrated advisory approach for all of a building's lifecycles. Other projects are occupied with the automatic measurement and evaluation of key figures for the operation of a building. Mobile devices are used that are automatically synchronized with central databases, allowing the efficient processing of repair and maintenance work.

In the field of sewage technology, an idea for a new process for reusing waste water was integrated into our research and development program, and will be applied above all in regions with limited access to fresh water. By taking into

consideration the required water quality for different applications, it was possible to reduce the expense of processing waste water. A patent application has been made for this solution. Another research project initiated together with a university aims to improve hygiene in developing countries through the use of appropriate sewage systems.

Modern tunnels have to offer users a safe escape route in the case of an emergency. For this purpose, parallel tunnel tubes are connected with each other at regular intervals. We have developed new solutions to construct the required side openings extremely economically. We used this technique for the first time with the construction of the City Tunnel in Malmö.

Our development projects in the field of road construction aim to optimize the use of machinery. A sliding form machine for concrete roofs was modified last year so that under varying tunneling conditions, the machinery can be efficiently adjusted as required during operation. In the context of another research project, the use of GPS with heavy excavation equipment was improved.

Services

Bilfinger Berger Facility Services develops new strategies for the maintenance of building equipment and utility supplies. By means of empirical investigations, indicators are found allowing maintenance intervals to be individually set and thus reducing costs.

A software-based project-management tool that Bilfinger Berger Industrial Services is creating supports the calculation, planning, management and processing of equipment stoppages in the chemical and petrochemical industries. The division is also occupied with the hybrid gasification of biomass. A new kind of reactor facilitates the economic production of a synthesized gas containing hydrogen.

Bilfinger Berger Power Services is carrying out a number of research projects with the goal of reducing power plants' CO_2 emissions. The projects include methods for processing new materials for higher combustion temperatures and the development of a new type of equipment for flue gas desulfurization.

Additional research projects aim to improve the combustion process in coal-fired power plants. For the economical operation of lignite-

burning systems, it is essential to increase the efficiency of the cogeneration plants. For this purpose, we optimize the technology of compressed-air drying for fluidized beds. We have applied for our own patents on the components used for this method.

With the low-NO_X gas burners developed by Bilfinger Berger Power Services, existing plants can fulfill the increasingly strict emission limits for nitrogen oxides. The high cost of a complete overhaul can be avoided, only the existing burners have to be modified.

As a result of improving the automatic production of welded connections on thick-walled piping, we can now carry out this work with a high quality standard directly on site. We have applied for a patent for this process.

Concession projects

In our Concessions business segment, we develop standard procedures for calculating the total costs of public-private-partnership projects together with state agencies and renowned universities and academic institutions. Another research project focuses on new models of organization, privatization and operation for federal autobahns.

The QuicNet research initiative (Quality Initiative for the Construction and Operation of Infrastructure Networks) was established to improve quality with the construction and operation of infrastructure projects. Bilfinger Berger leads a consortium of European industrial companies, research facilities and administrative bodies that is preparing for upcoming invitations to tender by the European Union.

Comprehensive information management

In order to make full use of potential synergies, we promote the exchange of knowledge in the continuously expanding Bilfinger Berger Group. A Group-wide semantic intranet search engine accesses numerous technical databases and collates the available information on a selected subject. We are extending this application with a multilingual database of technical vocabulary that collates the findings from source datasets in various languages. This reflects the Group's advancing internationalization and improves the ongoing networking of available knowledge.

In addition, we are occupied with the EU standards on construction products, which are becoming increasingly complex. Experts within the Group can be consulted by all of our employees via the intranet. Furthermore, we are playing an active part in the design of European regulations and standards through our involvement in the relevant committees.

Practical orientation and continuity

We continuously develop the Group's expertise and competencies in order to secure and extend our leading competitive position. We place particular emphasis on maintaining a practical orientation. The complex issues arising from our construction, services and concessions business can only be satisfactorily resolved by applying the results of our targeted research and development work. The aspect of sustainability will continue gaining importance in view of the demands of climate protection.