Foreword

SMB Construction International GmbH is the result of years of trusting and successful collaboration between the companies STRABAG and MAX BÖGL in the construction of testing sites for vehicle development. In this specific sector of road construction, highly developed construction techniques and innovative equipment are used to satisfy the high demands of the automotive manufacturers.

SMB has made ground-breaking achievements, particularly in the construction of high-speed tracks with banked curves. A highly motivated team of employees with the best technical training and the meticulous preparation of individual projects are some of our outstanding strengths. Expert consultation for developers and planners from early on is always a part of our service package.

An additional part of the SMB business is the construction of driving safety centres whose extreme tracks and unusual lane designs with difficult surfaces and unexpectedly occurring obstacles promote skillfulness at the wheel. SMB has comprehensive expertise and experience in pertinent projects.

Thanks to numerous successful projects, we are trusted by a well-known customer base. It is essential to reconfirm this trust consistently. With a high degree of dedication and flexibility, the SMB team rises to the constantly changing and growing challenges of the international automotive industry.

Dr. Markus Limbach  
STRABAG International GmbH  
Hans Holzinger  
MAX BÖGL Group
With the development of a globally unique range of equipment for the construction of parabolic-shaped banked curves, STRABAG and the MAX BÖGL Group – here united as SMB Construction International – demonstrate the highest innovation and experience potential in their specialist area, road construction. The accurate high-quality creation of all layers of the road surface is enabled by the latest production technology in the form of a highly developed, repeatedly tested bridge paver and the reliable final compression by precisely-controlled rollers.

With the greatest precision, the bridge paver can install asphalt layers as well as gravel base courses (and hydraulically stabilised base courses) in level, inclined and cambered surfaces. The paving screed is replaceable and can be any width, meaning that the lane can be produced in one piece without any longitudinal joints.

Highly-sensitive sensors scan the reference rails on the side next to the paver chassis horizontally and vertically and pass this data on to the central computer. Controlling the various hydraulic systems moves the paver chassis and the screed to the correct positions.
The bridge paver is loaded using the storage tank mounted on the side. This can be filled either using a refilling machine or by an excavator or wheel loader. Metering screws and conveyer chains carry the material to the paving screed, which ensures even distribution of the mixture over the complete installed width.

The precise compression of the parabolic surfaces is carried out by specially-shaped rollers, which are guided by supporting equipment with electronically-controlled hydraulic cable winches. Rollers with differing bunchings are used depending of the shape of the parabola or the transition curve. This installation without joints combined with maximum compression achieves the best possible quality and very good long-term characteristics over decades.
New vehicles must be carefully considered and designed. They have to outclass the predecessor model with technical innovations and qualitative improvements, be superior to the competitor’s product and be developed to market maturity as quickly as possible. At the end of the ever shorter development cycles comes testing in open areas, on snow and ice, on „torture tracks“ and in endurance tests.

To test endurance, SMB builds individually tailored test tracks all over the world: High-speed ovals or circular fast tracks with banked curves which enable driving without centrifugal force at speeds of up to 250 km/h and more depending on the curve radius. The SMB bridge paver makes it possible to construct banked curves with up to 49° cross incline. The curve transitions are usually created in the shape of sinusoids, Bloss curves or McConnell curves.

Round and oval tracks with parabolic banked curves
The bridge paver can also be used to profile the earth-work foundation. Instead of a road construction board, milling tools which produce a base with the correct level for the road surface are attached.

For the reconstruction of deteriorated fast lanes, which are frequently designed with steeper and therefore faster curves, it is necessary to mill off the existing road profile precisely to a newly defined level. SMB has developed suitable milling technologies for this purpose and already implemented them successfully.
Condition courses: Courses for endurance and individual testing

Up until market maturity, prototypes and preproduction vehicles have to pass through a widely varied range of tasks and uses in testing. Several million test kilometres are covered under extreme dynamic and topographical conditions before the first series models are delivered to the customers. When testing on modern test routes and tracks, issues such as reliability and durability, speed and drivability, comfort and suitability for everyday use are considered.

SMB has pertinent experience in the construction of dynamic areas which must be created with great surface precision and in the construction of brake testing tracks with concrete, natural stone, flagstone and sheet steel surfacing as well as skid pads. The company is also experienced in creating inclined tracks with angles of 30% and more as well as in the construction of accurate acoustic tracks. SMB’s wealth of experience is rounded off by a variety of rough road tracks and handling courses with differing radii and inclines. Project references for automotive proving stretches:
Modern test routes and tracks to simulate marginal driving situations

Project references for automotive proving tracks:

- Audi, Neustadt an der Donau
- Opel, Dudenhofen
- Matra/Ceram, Mortefontaine (France)
- Daimler-Benz, Papenburg
- Bosch, Boxberg
- DaimlerChrysler, Sindelfingen
- Ford, Lommel (Belgium)
- EuroSpeedway, Klettwitz
- Shanghai Volkswagen, Shanghai (PR of China)
- Volkswagen, Wolfsburg
- Bridgestone, Aprilia (Italy)
- Volkswagen, Ehra-Lessien
- Daimler, Wörth
- Volvo, Hällered (Sweden)
- Toyota, Zaventem (Belgium)
- Volkswagen, Maricopa (USA)
- Shanghai General Motors, Guang’de (PR of China)
Planning & consultation

Within the framework of planning a draught for a testing site, first the dimensions of the high-speed course with its recommended speeds are determined. Depending on the shape and size of the plot of land, this results in flatter or steeper curves, which generally have to be driven without lateral force.

Over the years, SMB has become an important consultant for automotive manufacturers and their suppliers when it comes to dimensioning and budgeting high-speed tracks, often even for the whole testing site. This applies not only to new construction, but also to the planning and designing of girder and cover replacements on existing tracks while simultaneously optimising the geometry.

The core issue when designing high-speed curves is the selection of a suitable parabola for the desired track speeds and the appropriate transition curve into a straight line. After checking the track draught design using driving simulation, detailed planning takes place and the curve data can be copied to the bridge paver’s control menu.
In structural planning, it is important that the working width of the bridge paver and the roller groups are taken into account both in a flat position and at an angle. This includes a sufficiently wide, flat and stable crest path and an equally stable and flat supply path on the inside of the curve – this usually becomes the breakdown lane later.

For the substructure of the banked curve, a support body made of suitable ballast installed in a horizontal position, which is to be reinforced at the corresponding gradient, is recommended. The road surface is built on this support body, starting with a hydraulically stabilised base course. The installation sequence between the fast track and the crest path is selected so that the upper edge joint is of maximum quality.

For compression, vibration rollers with variously shaped binder types are used behind the bridge paver. A roller plan determines the areas where the various rollers are used depending on the surface curvature.
Driving safety centres

The constant increase in private traffic and the associated risks mean that the safety requirements of citizens in road traffic are increasing. Additional safety opportunities are also required due to the indispensability of mobility, and not least the ever-more demanding expectations of logistics service providers.

Training regarding commonly occurring hazard situations will therefore represent an indispensable condition for participation in road traffic for all road users in future. Errors in traffic situations inevitably lead to accidents, often with serious consequences.

Building on years of experience in the construction of large test and training courses for the automotive industry, SMB is also involved in the planning, construction and operation of driving safety centres.

Thanks to the latest technology, here drivers familiarize themselves with handling the vehicle’s physical and technical limits as well as the ability of their own body to work under pressure. Early detection of possible sources of danger and appropriate responses are the focus of the training program. These are simulated realistically with the help of sprinkling systems, water fountains, skid pads, mountainous and gradient tracks as well as dynamic and sliding surfaces in various speed ranges.

Project references for driving safety centres:
- FSZ Berlin-Brandenburg
- FSZ Lüneburg
- FSZ Gründau
- FSZ Ludersdorf (Austria)
- FSZ Pachfurth (Austria)
Trustful collaboration — long-term partnership

Reference projects

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*PG = proving ground*
STRABAG, the operational core brand of the Austrian STRABAG SE, is involved in all areas of the construction industry worldwide. As one of the largest construction groups, with approximately 73,000 employees, STRABAG operates primarily in Central and Central Eastern Europe. Its core areas of expertise include structural engineering, road construction, tunnel engineering, civil engineering and project development.

STRABAG is the market leader in several countries, including Germany, particularly in traffic route engineering. A global network of over 500 locations and access to the required raw materials support the company’s strong position in the European market. Specialist and technical expertise, efficient organisation and innovative know-how make it possible for even the most demanding projects and customer requests to be carried out successfully.

STRABAG’s range of services now extends well beyond the construction work itself. It ranges from custom-tailored services to overall solutions from a single source – from development to planning and implementation to maintenance and operation. Furthermore, the materials and technologies used are constantly being further developed, particularly in the areas asphalt and concrete technology. Thanks to many years of experience with concession and operator models worldwide, STRABAG has taken on a leading role here.

MAX BÖGL

Founded in 1929 by Max Bögl, the company group headquartered in Neumarkt, Germany, can look back over more than 80 successful years of company history. With over 6,000 highly-qualified employees worldwide, MAX BÖGL is one of the top 5 largest German construction companies. Now managed by the third generation, the company group is also Germany’s largest privately owned construction company.

Over the decades, innovations in technology and organisation have allowed MAX BÖGL to develop from a provider of purely construction services into an internationally operating technology and service provider. DIN EN ISO 9001:2000 and SCC certified, the activities range across all areas and degrees of difficulty of the modern construction trade – from structural engineering and traffic route engineering to civil engineering and tunnel engineering to steel and installation construction, system building construction and supply and disposal.

Without losing sight of its core area of expertise, traditional construction, the trustworthy high-capacity partner MAX BÖGL Group performs customised individual services as reliably as complex overall solutions from one source – from planning and financing to implementation to operation. Over 35 locations, manufacturing plants and representative offices around the world – including in the United Arab Emirates and the Peoples’ Republic of China – open up new markets for trailblazing products and reinforce the company’s international orientation.