

NEWS

The latest news magazine from the NAUE Group

Issue 33 - November 2008

Introduction

Forty years after starting production of Terrafix® filter geotextiles by E.A.H. NAUE GmbH & Co. KG in Espelkamp-Fiestel, our company will be looking back on 25 years of independence on January 1, 2009.

After a quick decision typical for a medium-sized family business, we were given our independence from our parent E.A.H. NAUE GmbH & Co. KG – a major automotive supply - with only 3 weeks notice. With sales of approx. 6 million and 50 employees, we started on the path to the future of geosynthetic materials. After 25 years, we have arrived with approx. 440 employees with total sales of around 140 million and sales subsidiaries in Great Britain, France, Italy, Romania, Poland, the Netherlands and the US. The geosynthetic consulting office Bauberatung Geokunststoffe and the installation companies NAUE Sealing and UTEK support our core business, which is the manufacture and sale of an internationally unique range of geosynthetic products from our own production facilities at 3 locations in Germany: Espelkamp-Fiestel in the Minden-Lübbecke district in North Rhine Westphalia, Adorf in the Vogtland District Sachsen and Tönisberg in the Viersen District in North Rhine Westphalia. In addition, we also have a share in the company Anchor Lining



Systems (ALS) in Cape Town, South Africa, which manufactures and sells HDPE concrete protection stud liners.

Despite a difficult market environment, we were still able to increase our revenue and sales considerably in 2008. This was possible due to the excellent cooperation between all departments, which enabled fast adjustments and quick reaction to constantly changing conditions. This flexibility made a significant contribution to our success in 2008 and, for this reason, thank you to all employees!

Nowadays nothing is like it used to be! This sentence typifies the year 2008. There have never been such great swings in energy and raw material costs, the exchange rate and, last but not least, the financial markets as we have seen over the last few years. Oil prices have fluctuated over the course of the year between \$65 and \$150 a barrel. The exchange rate for the \$ has ranged from \$1.25 to \$1.60. It is interesting that none of the so-called "experts" predicted any of these developments. The peak of uncertainty and loss of trust can be seen in the current financial crisis.

History, however, has shown that medium-sized family companies with long-term strategies, solid financing, strong innovative power and high employee motivation can navigate such difficult times very well and, frequently, emerge much stronger. Despite all the bad news, we are convinced that our successful course will

continue and we will be able to handle these difficult market conditions. The worldwide financial crisis has caused a paradigm shift (M. Putz, Fraunhofer Gesellschaft): "Away from maximum profits from minimum capital, towards maximum value creation from minimum resources." However, our geosynthetic material solutions put us in an excellent position for geotechnic applications. Significant construction cost reductions, enormous reductions in the extraction, transport and installation of soil and construction materials as well as the parallel reduction of CO2 emissions favor geosynthetic construction techniques especially for public builders.

Taking a look at 2009, things currently seem very difficult. No one can currently predict the effects of the financial crisis on the manufacturing industry. However, NAUE remains on track to implement the planned investments for 2009. The work on the new logistics center is in full swing. Two new warehouse halls, a new office wing plus 5 additional truck loading stations will be finished by the end of January in an area of 15,000 m². This will enable us to continue to shorten our delivery times, significantly reduce truck waiting times and further increase our sales.

NAUE won the 2008 IGS award from the International Geosynthetics Society (IGS) at EuroGeo4 in Edinburgh for the invention of the geosynthetic clay liner and its associated technical developments. The Bentofix® clay liner, which was invented and patented by NAUE in 1988, revolutionized the applications of mineral clay liners. "The clay liner from the roll," which is superior to the traditional clay liner in terms of technology and cost, has established itself in the meantime. We thank the IGS committee for this award and feel, at the same time, motivated and that it is our duty to maintain our innovative course and provide our customers geosynthetic solutions that enable

Have you heard...?

In its 25th anniversary year as an independent company, NAUE has also filed its 25th patent application. This latest innovation, "geogrid columns", creates reinforcement columns made of overlapped geogrids. The reinforcement technique is used to improve the critical head area of structures such as stone columns.

safe, economical and environmentally-friendly construction.

As we reported in the last edition of NAUE News, Bentofix® types B 4000 and BZ 6000 also received a positive assessment of suitability in Germany for the installation of mineral sealing in landfill surface sealing systems for class 1 landfills. On September 25, we applied for the expansion of the verification of suitability for class 2 landfills. We hope that the geosynthetic package consisting of a BAM-approved Carbofol® synthetic sealing liner, a BAM-approved Secudrain® drainage layer and a State-approved Bentofix® clay liner will convince the doubters that when using these geosynthetic material components, you can realize safe land-

National projects

Hasenholz soil and construction waste landfill in Tuttlingen [Volker Streffing-Hellhake]?

The Hasenholz landfill is located south of the city of Tuttlingen in Baden Württemberg, Germany, next to the federal road. The landfill will continue to be operated until 2009. It mainly contains excavated earth, construction waste as well as building and demolition waste.

The County of Tuttlingen intends to decommission the landfill Hasenholz in 2009 and reclaim it according to approved specifications. Therefore, the landfill will be covered with a state-of-the-art capping system including a rainwater collection system in 3 construction stages by August 2009. The operator will continue to fill the landfill until the maximum capacity is reached. During the installation of the sealing system the landfill will continue to be operated by the county.

The approved closure plan included a surface sealing system consisting of a 10 – 15 cm thick leveling layer (foundry sand), a 50 cm thick compacted clay liner (CCL - 2-layer each 25 cm; hydraulic conductivity $5 \cdot 10^{-9}$ m/s), a 30 cm thick mineral rainwater collection layer made from foundry slag, grain size 16/32 as well as a 3 m thick recultivation layer. The soil used for the recultivation layer is excavated

fill sealing systems that are economical, ecologically superior and long-lasting (> 100 years). We are also making headway with Terrafix® Soft Rock. The idea of packing sand and implementing this product as a soft yet erosion-stable solution for coastline protection is rapidly gaining acceptance. The NAUE-sponsored and multiple-award-winning work of Dr. Juan Recio ("Hydraulic Stability of Geotextile Sand Containers for Coastal Structures"), which enables the assessment of sand containers under the load of sea conditions, has also certainly contributed to this. In the infrastructure area, the superior properties of Combigrig® are gaining popularity where low-bearing soils are to be separated from the covering layers used and an extension of the suitability of use is the

goal using reinforcement. The prospects of this unique composite product made from Secugrid® and Secutex® have been estimated so euphorically by the participating scientists that NAUE now only needs ONE product for the future - Combigrig®!

We would like to thank our employees for their excellent work and our customers for their trust, and wish you, your families and all readers of NAUE news Happy Holidays and a healthy and happy 2009.

from a current tunnel construction project also nearby to the city of Tuttlingen.

During the proposal phase, NAUE GmbH & Co. KG suggested using a geosynthetic clay liner (GCL) Bentofix® B 4000 as an alternative to the

Vollzugsfragen"-group (construction of mineral sealing layers in surface sealing systems for landfills).

Slope Installation of Bentofix® B 4000 with the German federal state approval (LAGA)



50 cm thick mineral clay liner as listed in the tender. The selected needle-punched GCL has a high swelling bentonite powder sealing layer, high interface and internal shear properties and is considered as an approved alternative to CCLs. It has also been rated positively by German LAGA Ad-hoc-AG "Deponietechnische

The bidding consortium SKS Bau GmbH & Co. KG and Heim Bauunternehmen GmbH & Co. KG, among others, was awarded the construction contract due to its cost-effective alternative proposal.

Subsequently, NAUE Sealing GmbH & Co. KG received a contract from the bidding consortium for the delivery and installation of the GCL Bentofix® B 4000 LAGA. The installation of the geosynthetic material began in June 2008. The 3-stage layer installation covers an area of 30,000 m² and was the first project in Germany to use a GCL that was rated positively by LAGA Ad-hoc-AG.

Have you heard...?

...that a special trucking company sent a whole "armada" of trucks to the NAUE production facility in Espelkamp-Fiestel, Germany, to pick up a delivery of Bentofix® GCL rolls?. This shipment is part of over 1 million m² of NAUE geosynthetics shipped this year to several Eastern European projects.

The truck "armada" in front of the NAUE Headquarters waiting for the loading process



National projects

Construction of a road tunnel on the Autobahn A38 [Marc Meissner]

Today's modern traffic tunnels are increasingly being planned with a projected functionality for over 100 years – despite difficult geological and engineering conditions. The overriding objective of tunnel construction is the protection against the effects of groundwater and penetrating water. The local conditions at the highway tunnel construction site on the autobahn A38 between Breitenworbis and

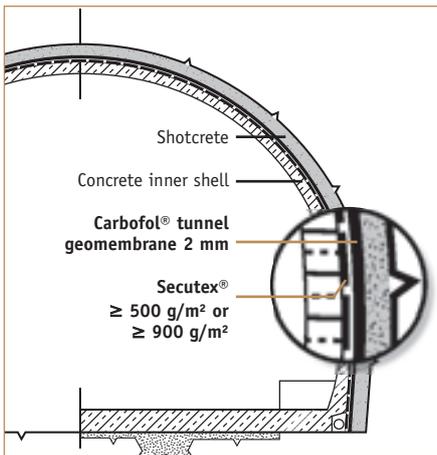
Bleicheroda required a seepage water sealing system, also called umbrella lining, to protect against the surrounding moisture. The converging seepage water is discharged safely via the lengthwise drainage system at the foot of the construction site. The client, the construction company Baresel GmbH, received the contract from the German Federal Ministry of Transport to securely seal the two 849 m and 874 m long pipes of the highway tunnel construction for the long-term as per the German regulation ZTV-ING. They then contracted NAUE Sealing

GmbH & Co. KG to carry out the installation with the following products:

- 33,500 m² Carbofol® tunnel geomembrane
- 33,500 m² Secutex® R1001-B2 geosynthetic protection layer
- 7,000 running meters of Carbofol® water stops

The Carbofol® tunnel geomembrane is produced with a one-sided signal layer with a thickness of approx. 0.1 mm. The signal layer is intended to allow a visual, full-surface quality assurance of the sealing liner. It shows immediately if there is any damage to the geomembrane and it also provides a significant improvement to the lighting conditions in the tunnel.

As a supplier of complete tunnel sealing systems with years of experience providing extreme reliability, NAUE SEALING GmbH & Co. KG has again provided its regular high standards of quality for this project and was able to complete the project on time within the specified short schedule.



Carbofol® water stops welded against Carbofol® tunnel geomembrane



Groundwater protection with Carbofol® and Secutex® [Jörn Besser]

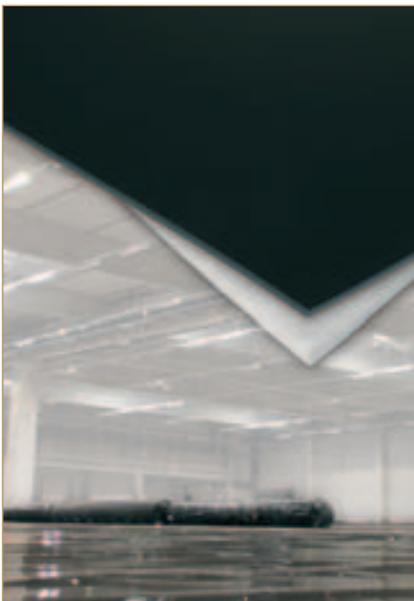
When the massive logistics campus in Unna begins operation in the near future, it will change the face of the region. Approx. 350 people will be working in the massive 90,000 square metre hall helping two million pallets annually get to their proper destination. The facility requires proper safeguards especially with regards to chemical materials.

The leading international logistics company DHL Exel Supply Chain designed the new logistics center specially for industrial companies

from the cosmetics industry. The personal care and hygiene products that will be stored and transported from there are certainly beneficial for your skin, but they certainly have no business in our drinking water, i.e. groundwater. For this reason, special environmental specifications were applied to the construction of the Unna logistics campus. For example, there is a three millimetre thick Carbofol® geomembrane under the trafficable, reinforced concrete which prevents any liquid leaking into the environment. And the same is true for the entire 90,000 square metre warehouse space. The company TAT Abdichtungstechnik Troisdorf

GmbH did a clean and professional job of welding the German DIBT-certified Carbofol® geomembrane into place. Regulatory agencies have very high requirements for these kinds of geomembranes. The German Certification Institute for Construction Engineering (DIBt) has approved the Carbofol® 509 used in Unna as a sealing element and recognized it as especially well-suited for sealing chemical storage facilities, fuel service stations, containment basins, building seals, tank farms, container surfaces as well as chemical production facilities.

A Secutex® protective nonwoven which separates the soil from the sealing liner is used to protect the Carbofol® geomembrane liner from the subgrade. The sealing system selected for the new DHL logistics campus is state-of-the-art and meets all requirements and specifications for long-term groundwater protection, making it easy to say: "The groundwater in Unna is safe."



DHL warehouse in Unna sealed with Carbofol®

International projects

Scout Moor Windpark (UK) [Chris Quirk]

Scout Moor Wind Farm is situated in the West Pennine Moors in Lancashire, Northwest England. Like many wind farms, the space and weather conditions are ideal for harvesting wind power, but site access and establishing firm turbine footings is a challenge. The 65MW, 26-turbine Scout Moor farm was constructed upon an extensive peat bog that is underlain by six coal seams and a number of abandoned, shallow mines.

Altogether 12 km of roads were planned to ensure access. Germany-based geosynthetic consultant "BBG Bauberatung Geokunststoffe GmbH & Co. KG" carried out the design of the roads and 26 crane pad construction areas. A 'floating road' construction—essentially, a linear load transfer platform—proved to be the right solution, as it took into consideration the various site constraints as well as issues of constructability, design life and economics, all of which played a significant role in the final decisions.



Placement of crushed gravel base course over the installed Secugrid® reinforcement

reduced the quantity of aggregate needed. In the United Kingdom, aggregate taxes can heavily affect project budgets, much in the way that suitable aggregate availability impacts project budgets elsewhere.

For the 4.5m-wide access roads, two layers of

4.75m-wide Secugrid were installed along the length of the road. This represented a significant time (and cost) saving over the original design, which had called for 4m-wide geogrids that would be installed across the road width. Secugrid was identified as a technically equivalent and economically superior alternative; and the project was built within the scheduled time frame.

The very low shear strength parameters of the subgrade, together with the potential collapse of mining voids in the area, required road reinforcement to prevent bearing failure. Geogrids were selected as the most suitable reinforcement material. They provided a relatively low cost solution when measured with constructability and ecological impact on the peat bog environment. The improved load-distribution behaviour of the geogrid-reinforced aggregate layers meant stress concentrations over the soft peat layers were reduced. This minimised differential settlements at the road surface. Also, it

Approximately 500,000 m² of Secugrid geogrids (tensile strengths from 30 kN/m to 400 kN/m) were used for the project.

Fueling the future [Carsten Lesny]

With the construction of a major, new fuel tank farm and underground pipeline, Port Canaveral, Florida has quickly become a major piece of the state's fuel security. Hurricanes in 2004 damaged fuel supply lines in Tampa on the west side of Florida. It was decided that a strong eastern fuel post was needed.

Port Canaveral was the answer, and a tight, two-year timeline from approval through construction was set.

Port Canaveral lies on the east coast, only 50 miles from Orlando. The port is an important hub for cargo, cruises, and federal government activity, including the nearby launch site for the National Aeronautics and Space Administration (NASA).

But Florida is a difficult state for engineering. The water table is high and the fine sandy and clay soils present significant challenges to sites that must support high loads. The fuel tank farm's soils were mainly organic and had a high plasticity - yet, they needed to support tanks for 3 million barrels of fuel and heavy, daily truck traffic. The expected stresses would exceed the soils' normal bearing capacity.

Project engineers needed to stabilize the site so that the surface activity could be sustained long term and would support future expansion. These subgrade challenges created an ideal situation for the specification and installation of geogrids—strong, polymeric grids used to reinforce foundations, base course, walls and slopes.

The project team specified Secugrid® 20/20 Q1, a polypropylene (PP) geogrid manufactured by NAUE GmbH & Co. KG. The material's tensile load transfer ability with low elongation made it a strong choice for stabilizing the difficult soils. Secugrid was installed between the leveled sandy subgrade and a first layer of sandy material with approximately 50 cm (20 in.) followed by a second layer of coarse gravel with about 20 cm (8 in.).

In total, 130,000 m² of geogrid were placed.

PROJECT DATA

Location: Cape Canaveral, Florida
Product: 130,000 m² of Secugrid 20/20 Q1
Timeframe: March / April 2008
Client: Vitol Inc.
Design: Allen Engineering, Inc.
Earthworks and Geogrid: Gunnstruction Inc.

Have you heard...?

At EuroGeo4 in 2008 NAUE ran a competition to demonstrate the effectiveness and cost saving potential of Combigrd. An old landfill in Glasgow, Scotland called Kilbowie Landfill is being remediated to be used as a Park and Ride car park along with other potential development. The old landfill needed to be reprofiled and the ground strengthened to be able to withstand the required traffic movements. In consultation with the Engineer, White Young and Green a Combigrd 60/60 Q1 was proposed by BBG. Changing the design by reducing the thickness of aggregate and replacing it with 16,500 m² of Combigrd saved the client 75,000GBP, this equates to a saving of 4.54GBP/m². The idea at the exhibition was to guess how much money was saved.



Chris Quirk (left) and Prof. Dr.-Ing. Heerten (right) handing over the whiskey bottle to the winner, Nina Horstmann

The winner was Nina Horstmann of SLR. So congratulations to Nina who won a very special bottle of Glengoyne whiskey presented by Professor Heerten who also very kindly offered to help her drink it.

International projects

More than 1,100,000 m² of NAUE geosynthetics in Hungary

[Sándor Romencsák]

One of Hungary's biggest waste disposal sites - the 20-ha Szeged regional landfill - has been established atop a 17-year-old, 18-ha landfill following the old site's closure order. The new landfill complies with current Hungarian and EU regulations, and with this dual closure and construction, which happened while waste was

still being accepted, it solves both Szeged's old and new waste management concerns. that the baseliner, due to the missing geomembrane liner, did not fulfill the EU regulation requirement. In closing and modernizing the facility, this old zone was isolated in a 'sarcophagus' style.

Therefore a vertical wall was designed, which should be sealed with high-density polyethylene (HDPE) geomembrane and a drainage system should ensure the safe drainage of the landfill leachate from the new landfill. The leveling

(GCL) was used to replace the large quantity of clay that had traditionally been used for lining/capping. The barrier equivalence of the Bentofix® GCL was confirmed with technical reports and equivalency calculations by NAUE engineers. To complete the requested composite lining system the Bentofix® GCL layer was covered by a chemical resistant 2.5 mm thick Carbofol® HDPE geomembrane, finalizing the state of the art base liner system.

The construction in this large area was significantly accelerated by easy installation of Bentofix® GCLs and the immediate availability of 9.4 m x 100 m Carbofol® geomembrane rolls. The required mechanical protection of the Carbofol® geomembrane against the gravel leachate collection layer was ensured by a 1200 g/m² Secutex R 1204 needlepunched non-woven geotextile. Additionally the drainage capacity of the gravel leachate collection layer was enhanced with a geosynthetic drainage net Secudrain XX8 which was laid directly over the Secutex® protection layer.

Year of construction: 2005-2007

City/Country: Szeged, Hungary

Installed products:

Carbofol® HDPE 2,5 mm	270 000 m ²
Secutex® R 1204	240 000 m ²
Bentofix® NSP 4900	205 000 m ²
Secugrid® 60/60 Q1	275 000 m ²
Secudrän® XX8	125 000 m ²

layer applied to the old waste body -which is also the subgrade of the new landfill - was reinforced with Secugrid® 60/60 Q1 type geogrid. By using stiff Secugrid® geogrids the reduction of any differential settlements is ensured which might harm the performance of the geomembrane base liner. One layer of Bentofix® NSP 4900 geosynthetic clay liner

Aerial view of the landfill Szeged during the installation of the NAUE geosynthetics



still being accepted, it solves both Szeged's old and new waste management concerns.

The investment has secured waste disposal space for 83 towns for a period of 40-60 years.

The old 7-12m thick waste layer had a 1.5 m thick natural clay bottom layer of 10⁻⁹ m/s, so

Did you know...?

Geotextiles for coastal protection in Portugal

Near Figueira da Foz, at the Portuguese Atlantic shore, a coastal protection project was realised successfully at the beginning of last summer.

Several heavy storms in winter caused massive damages to the sandy beach and dune system. Extensive beach nourishments with sand and partial sand fillings were not able to achieve a long-term solution. Therefore the Portuguese nature conservation agency selected a long-term erosion control measure. After intensive studies, the dune protection system with hydraulically sand filled flexible Soft Rock tubes, suggested by the geosynthetic consultant "BBG Bauberatung Geokunststoffe", was realised.

A length of 120 m was covered with 5 layers of 42 Soft Rock sandtubes manufactured of needle-punched staple fibre nonwoven geotextiles. The Soft Rock geotextile-tubes, each 20 m long and with a diameter of 1.6 m, build a stable barrier system in front of the dune-system. A geotextile Terrafix® 609 was installed to prevent erosion on the backside of the barrier system.

CELBI (a Portuguese company) commissioned the NAUE partner B.B.F. with this project. After the effective realisation within approx. 3 weeks all parties invol-

Installation of Terrafix® Soft Rock for coastal protection measurements at the Portuguese shore



ved are working to spread the idea of this solution in further coastal protection projects.

**1st Innovations forum with
Dr. Annette Schavan
The German Federal Secretary
visits NAUE in Fiestel**

"Research is the driving power of our economy and through innovative processes it ensures, that our enterprises stay competitive in this globalised world" says Steffen

Kampeter, member of the German parliament. "The raw materials of our country are not oil and gas but the ideas of scientists and engineers. "We will only be able to preserve our top position in the global economy with new technologies" ensures Mr. Kampeter, the delegate of the current governing party.

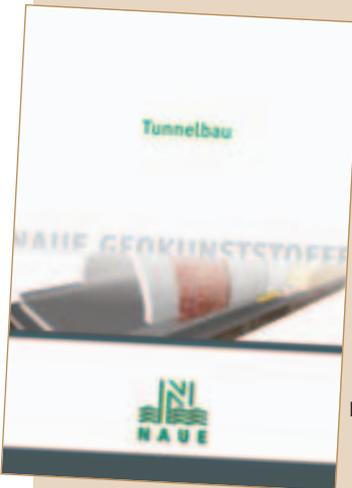
For this reason the German Federal Ministry of Education and Research is financially supporting several research projects, that have the goal to develop future-essential innovations in various sectors, also here in our region, the "wind mill county".

Regarding this, the member of the parlia-



Sebastian Naue (left) and Prof. Dr.-Ing. Heerten (right) welcome the Federal Minister for Research and Education, Mrs Dr. Schavan and Member of the German Parliament, Mr Steffen Kampeter, to the 1st Innovation Forum of the German county Minden-Luebbecke

Did you know...?



Complete sealing systems for tunnel constructions, from the manufacturing to the installation, are available from NAUE. Details are described in our new tunnel construction brochure. Here you can find comprehensive information all around tunnels and geosynthetic functions, such as "sealing", "protection", "drainage" and "control" with informative illustrations with NAUE products for modern tunnel design.

If this raised your interest, please order your issue here:

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ment, Steffen Kampeter, invited the German Federal, Mrs. Dr. Annette Schavan, to the 1st "Innovations forum" Minden-Lübbecke, Germany. It took place on the 28th October 2008 at the head office of the NAUE group. After the presentation of local supported projects (one of them with NAUE involvement) the more than 50 participants from local enterprises, industry, finances and education took the chance to discuss updated topics of the German research politics and their global position.

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Exhibition and seminar schedules

December 01. – 05.12.2008	Pollutec 2008	Lyon, France
January 19. – 21.01.2009	Environment 2009	Abu Dhabi, U. A. E.
February 10. – 12.02.2009	Aquaterra	Amsterdam, Netherlands
25. – 27.02.2009	Geosynthetics 2009	Salt Lake City, USA
March 04. – 06.03.2009	Railways & Harbours 2009	Cape Town, South Africa
16. – 19.03.2009	EWEC Europe's premier wind energy event	Marseille, France
24. – 25.03.2009	Irish Water Waste & Environment Expo (IWWE)	Dublin, Ireland



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