

NEWS

The latest news magazine from the Naue Fasertechnik Group

Issue 21 - December 2003

Introduction

As the saying goes - nothing is as permanent as change! This also is true of our Naue News which we are pleased to present here in its 21st issue. Complying with the results of our readers' survey, the future issues will be more customer-oriented and will contain even more information about our projects and products; information to motivate, to present applications and to answer questions about practical geotechnics using geosynthetics. In this latest issue, you can already find various examples of practice-directed national and international applications. But not only has the Naue News been improved, our German sales department will be re-organised to provide better customer service as we have decided to provide an improved sales structure in Germany integrating tried-and-proven practice (please see information on the right).

As the saying goes - nothing is as permanent as change! This also is true of the Naue Fasertechnik Corporate Group which must continue to fight to hold its own in the increasingly difficult construction sector. Innovative conceptions can only be accepted if they have proven in the field to be of value. Naue Fasertechnik must recognize and consider changing market and customer conditions to maintain its leading position in the geosynthetic market. Current examples include improved foundation methods using Secugrid® and Combigrigrid® piles, Bentofix® for sealing structures and Carbofix® and Anchorlining for concrete protection. We shall continue to focus our energy on "geotechnics with geosynthetics" whilst looking optimistically ahead. Despite all these upheavals, we are looking forward to at least one permanent factor which never changes and which we hope will allow us and our

readers a well-deserved break from the everyday trot - the yearly celebration of Christmas and the New Year. We would like to wish all our readers a peaceful Christmas with your loved ones and happiness and prosperity for the New Year. ■

Re-organization of the German sales department

Naue Fasertechnik has re-established its sales department "Environmental protection" (VU) for all geosynthetic applications in the fields of landfill and tunnel construction, concrete protection and WHG projects (in compliance with the German Water Resources Act) under the management of Thomas Tepper (Tönisberg branch) and Kai-Christian Ledel (Bückeburg branch).

The VU department coordinates the installation works of Naue Sealing and our installation partners for tunnel construction and environmental protection. We have also established another sales department for Infrastructure (VI) under the management of Walter Federico Ewert to implement our vision of making reinforced soil constructions just as natural as reinforcing concrete and especially to increase the sales of our reinforcing products Secugrid® and Combigrigrid®. Hence, we will be able to offer a better customer service in cooperation with the engineering consultants BBG (Bauberatung Geokunststoffe), Lemförde.

On behalf of the management


Dr.-Ing. Georg Heerten

Appraisal of the Naue News



Together with the last issue No. 20, all external readers of the Naue News (an estimated 9,000) received a questionnaire with which to assess our company journal. We were pleased about the considerable feedback (53 % decision makers, 30 % customers, 10 % universities, 7 % others) and thank all our readers for the time they took to answer our questions.

89 % evaluate the Naue News as a good or very good journal and 71 % consider it to be an important or very important medium for obtaining information. First of all, the readers wish to be informed about projects and products, about trade shows and exhibitions, conferences and symposiums as well as about the company itself. 65 % prefer the printed version of the Naue News while 30 % want to receive the newsletter by email. We are very pleased about the attributes associated with Naue Fasertechnik:

- **Quality**
- **Good partners**
- **Flexible**
- **Experience**
- **Future-orientated**

Of course, we also received constructive suggestions for improvement which we will be looking at more closely. Our readers mainly wanted more information and simple design recommendations on CD. We have carefully analysed the results of the survey and put some of them into practice. We hope you like the contents and layout of the new Naue News. Please do not hesitate to contact Kent von Maubeuge (marketing department, email info@naue.com) to give us your opinion.

Finally, here are a few extracts of the comments you made that motivate us to improve our service for you:

- "[...] Whatever you do, you do it rather well."
- "[...] Events organised by Naue emphasize the scientific aspect."
- "[...] Keep up the good work."

Thank you! ■

national projects

Slope stabilization near Weesenstein, Germany [Andreas Fricke]

The flood disaster in 2002 destroyed approx. 80 % of the infrastructure in the valley "Müglitztal", Dresden. Near Weesenstein, a 11 m high railway embankment in the area of an undercut slope was flushed away over a distance of approx. 100 m so that the rail traffic was cut off. To get the rail traffic run-



Placing of cover soil on Secugrid®

ning again in the shortest possible time, the German National Railways (DB Projekt-Bau GmbH, NL Süd-Ost) and the planning company EVP/GIV GmbH, NL Dresden, decided to install a reinforced soil structure with a steel grid formwork as an outer face as a temporary measure to secure the level of construction as the Federal Railways Agency's standard guideline does not approve the application of reinforced constructions where they are subjected to rail traffic load. In addition, the final structure can only be approved in accordance with a flood protection concept for the Müglitz River which at that time did not exist. The combination of a geosynthetic reinforcement and covering material ensures slope and ground stability. The steel lattice on the outer face stabilizes the slope surface and a separation layer and filter made of non-woven fabric prevent the soil from crumbling away. The approx. 5 m high geogrid-reinforced part at the bottom of the slope is constructed with approx. 60° inclination and is topped by a 4 m high embankment. The structural analysis for the reinforced slope was carried out on the basis of the German recommendations for geosynthetic reinforcements (EBGEO, 1997) The applied product Secugrid®

120/40 R6 has a Federal Railways Agency's (Eisenbahnbundesamt EBA) certification for this application. A 0/45 mm crushed mix acted as covering material. The Secugrid® reinforcement element was installed in 10 layers with a distance of 0,50 m in line with the design analysis. The immediate interlocking effect of Secugrid® with the covering material and the product structure demand high transfer of forces and minimal deformation of the embankment both during installation and under traffic load. Structural deformation when installing Secugrid® need not be taken into account as any occurring force is immediately absorbed by Secugrid®.

The reducing coefficient A2 for installation damage after compacting which is to be taken into account when dimensioning the geogrid was determined in a project-specific test field carried out in line with EBGEO by the Saxon Textile Research Institute (stfi, Sächsisches Textilforschungsinstitut e.V.). The GEPRO GmbH was responsible for the inspection of the construction documents and the final acceptance. The reinforced slope remains and serves as implied stabilization in the final structure. Within just a few weeks, the whole structure had been completed by a pool of 10 local construction companies using simple, fast and cost-efficient construction methods so that the flow of regular traffic was quickly reinstated. Today, modern construction methods like these can prevent erosion hazards in times of flooding. ■

Geobarrier® as flood protection in Rheinau Harbour in Cologne, Germany [André Weßling]

In view of fluctuating water levels during the year, building in the drainage basin of large rivers has since time began always been a technical challenge especially in areas which have grown up through force of habit near the rivers in large cities during the centuries. As is the case in Cologne. Summer 2003 saw the first use of Geobarrier® as a temporary flood protection for a container park. The construction project for the reorganisation of the Rheinau Harbour

in Cologne involved a total volume of work at a cost of approximately € 600 million and is one of the largest urbanistic measures in Germany. As the construction site lies in the immediate vicinity of the River Rhine, flood protection for the site is an issue of high priority. This was dramatically put to the test on 3 January 2003 when the Rhine quickly rose and flowed over the quay walls of the Rheinau Harbour. On this day, the Rhine reached its highest level yet - 9.72 m. The top of the quay wall measures approximately 9.30 m measured against the Cologne Water Level and on this day, the waters of the Rhine stood about 40 cm over the quay wall level. The excavation area near the 1.5 km long underground garage which were then under construction ran full of Rhine water. In a hundred-year flood, the Rhine can even reach



Geobarrier® as support system for flood protection

levels of more than 10.50 m Cologne Water Level so it was essential to take this fact into consideration when designing and installing the temporary site facilities for this large construction site. This is particularly important for container parks which in the event of serious flooding cannot be dismantled and taken away promptly. The first of approximately 20 planned new construction projects in the Rheinau Harbour is the office and residential building bearing the name "Kap am Südkai" which means "South Quay Cap". The contract for work was awarded to the general contractor HOCHTIEF Construction AG, NL West. Two different types of foundations were developed for the site supervision container park one of which considered Geobarrier® as a support system for the container park. This alternative solution

Volume of lectures held at the Geosynthetic Colloquium 2003



As we already mentioned in Issue 19 of the Naue News, January of this year saw our innovative and informative event under the practised leadership of Mr em. Univ.Prof. Dr.-Ing. Dr.-Ing. E.h. Rudolf Floss, Chairman of the Specialists section "Geosynthetics in Geotechnology" of the DGGT (German Association for Geotechnology). At last it is ready! The collection of lectures held at the Third Geosynthetics Colloquium has been published and now completes the Naue Fasertechnik series of publications. But this time not only in book form! To please the growing number of customers who have asked for digital documents, we have reacted immediately and issued the lectures on a CD. The CD of lectures (limited edition) is available as from now from the Marketing department, Lübbecke. Just send an email marking it "3. Geosynthetic Colloquium CD" to info@naue.com or call Ms Rux under +49 5741 4008 32 or send a fax to +49 5741 4008 84. All lecturers and participants at the colloquium will be receiving under separate cover a copy of the CD free of charge, as promised. ■

using Geobarrier® was commissioned for the job for reason of the cost advantages of about 30 % compared with the original solution using concrete shaft rings and was carried out by BSI Bergsicherung Illfeld GmbH in June 2003. Geobarrier® comprises columns jacketed with Combigrid® 1.00 m in diameter and 1.50 m high. The height of the columns was deter-

mined on the basis of a maximum Cologne Water Level of 10.50 m. Combigrid® - a composite of a non-woven geotextile and a geogrid was used as permanent formwork and comprises the base products Secugrid® 40/40 Q1 a bi-axially laid, monolithic geogrid and a Secutex® non-woven fabric made by NAUE Fasertechnik GmbH & Co. KG, which are joint welded to-

gether. The columns are packed with a mix of fly-ash and cement. This solution not only creates a stable support system for the container park but also protects the containers from possible flooding. ■

international projects

Retaining walls construction, Marbella Hill, Spain [Burkard Lenze]

Much sought-after building plots near the coast in Marbella and the surroundings are becoming increasingly scarce which means that new holiday resorts are gradually being located in the steep mountainous areas. In the new development areas, the search is on for geotechnical solutions which allow building plots with a large horizontal area, in spite of the difficult morphology.

Example: an investor was interested in a geosynthetic solution on a steeply inclined plot (slope inclination between 1:1.5 and 1:2) on which three large villas with swimming pools and tennis courts etc. were planned. Following the presentation of the initial planning suggestions by Naue Fasertechnik, BBG Bauberatung Geokunststoffe, Lemförde, was commissioned by the Spanish architect with the detailed project planning of a reinforced retaining wall construction. Based on calculations of the interior and exterior stability of the reinforced earth, five walls were designed which would allow a maximum difference in height of 18 m to be overcome. A horizontal area of approximately 9,000 m² was to be created on two pla-

teaus on which the buildings could later be erected. Work on the erection of 85° sloping walls began in Summer 2002. The retaining walls consist of 60 cm thick compacted layers with installed Secugrid® 80/20 R6 geogrid with embedded lengths of 2.5 to 12 m. Secugrid® 200/40 R6 geogrid, as secondary reinforcement, was placed in areas, where extremely high forces are expected, centrally between the 60 cm layers of compacted earth. The highest point of the wall is composed of 40 individual layers all built according to the so-called "wrap-around" method. A galvanized steel grid was used on the one hand as permanent formwork simultaneously providing the construction with an even front face. In the front wrap-around area, geotextile Secutex® R 204 prevents erosion of the compacted soil and the texture of the surface permits the outer shell to be planted later on with vegetation. A part of the wall will be clad with blocks of natural stone to allow for a more interesting landscaping.

Erosion caused by weathering delayed the first phase of construction work, so the subsequent areas were protected with Carbofol® geomembranes in combination with geosynthetic drainage mats Secudrän® on the outer edges of the retaining wall surfaces. The installation of around 50,000 m² geogrids and approximately 10,000 m² of geotextiles stabilized around 40,000 m³ (!) backfill material. By using this intelligent and innovative geosynthetic reinforced solution a hillside unfit for building purposes was turned into an approximately 9,000 m² large level plateau which now can be used for individual building developments. These construction measures

also resulted in an additional increase in the value of the property. ■

Base sealing of a domestic landfill in Antalya, Turkey [Armin Leue]

The high cost of land expropriation was one of the most significant criteria when searching for new landfill sites for domestic waste in Antalya, a popular tourist resort in Turkey. After an intensive search and much consideration, the city council approved the planning and construction of an area about 100 ha in total. One aspect of the choice was that a site of this size could be used over the long term. In an initial selection of components for the composite base sealing system, technical and economic factors played a decisive role and in the end, the choice fell between a comparison of conventional compacted clay (typically 50 cm thick) liner or a geosynthetic clay liner (GCL) beneath the geomembrane. Another criteria which spoke for GCLs (typically 1 cm thick) was that this would allow a higher volume of waste to be deposited. The consultancy & engineering company Tugal Environmental Technologies in Istanbul, active in the sector for more than 10 years, was awarded the contract for planning the new landfill site for domestic waste for the city of Antalya which includes integrating the site into local conditions, base sealing system, protection layer for the geomembrane and leachate collection system. After comparing mineral sealing systems, the environmental authorities decided in the end on a needlepunched GCL Bentofix® a bentonite sealing liner made of



Construction of a retaining wall using Secugrid®

3rd European Geosynthetics Conference "EuroGeo3" in Munich, Germany

The "EuroGeo3" to be held from 1 to 3 March 2004 at the Technical University in Munich is a conference that no construction company, engineering company, official bodies and end-users should miss. An exhibition will be held in addition to workshops, lectures and of course a scientific exchange of information. Naue Fasertechnik and BBG Bauberatung Geokunststoffe will of course be there waiting to surprise you with innovations and the latest news. Why is the conference worth a visit?

- We will show you how to build **long-lasting constructions** using geosynthetics
- We will be presenting the **latest technical developments** in your construction method, an advantage you can put straight away into practice.
- You will learn about the **enormous cost-saving potential** geosynthetics can bring for your company.

We are looking forward to seeing you there! <http://www.gb.bv.tum.de/eurogeo3/main.htm> ■



natural sodium bentonite with excellent sealing properties, high-level shear behaviour and cost-efficient installation, all factors contributing to the decision. Another factor

www.secugrid.com

We have created a new Internet information platform for our high strength Secugrid® and Combi-grid® geogrids for soil reinforcement:

www.secugrid.com

in addition to general information on Naue Fasertechnik reinforcement products, you will find technical information and contributions plus descriptive applications. It's really worth adding this Link to your favourites to click into again and again! ■

was the uncertainty as to whether conventional compacted clay (with a defined water content) could be installed at all without any problems in the existing climatic conditions. Carbofol® as HDPE liner and Secutex® as protection geotextile layer were also used in the construction of the landfill which is the first in Turkey to be completely sealed at the base using the selected geosynthetic components. The selected Naue Fasertechnik system of geosynthetics combined with rapid and professional installation enabled the town of Antalya to put the landfill to use sooner than planned besides saving considerable sums compared with a conventional system of a combined clay liner and a protective layer of sand on the geomembrane. Moreover, all those involved in the project are convinced

that the geosynthetic system solution produced by Naue Fasertechnik is the technically superior and more durable choice. ■



Installing a composite lining system using Carbofol® on top of Bentofix®

Products

Secugrid® 40/40 Q6 reinforcement geogrid for bridging subsidences

Initial trials at the Fachhochschule (technical college) Dessau successfully demonstrated that Secugrid® 400/40 R6 was suitable for bridging areas prone to collapsing subgrades (subsidence); the results also showed that the product was only being utilized to a fraction of its real tensile capacity. The results clearly showed that a low-strength Secugrid® geogrid installed as a single layer isotropic geosynthetic reinforcement demonstrably met all of the requirements demanded by the Landesamt für Strassenbau (State Office for Road Construction) in the federal state of Saxony-Anhalt - for the first time ever in Germany. In a further large-scale test under Professor Paul, Hochschule Anhalt (technical university) in Dessau, Secugrid® 40/40 Q6 was tested under the same conditions as in the initial trials. The aim was to provide geosynthetic reinforcement to a road following subsidence

which would allow the carrying of normal traffic for at least two weeks. The selected subsidence in the road surface was not to be smaller than 1/60 (proportional value of max. subsidence to diameter of the subsidence crater). Traffic load was simulated using 4 presses in series which placed loads according to controlled delay times, for example simulating the traversing of a truck at about 60 km/h. Approximately 300,000 passes were carried out. After a regular trial period of 300,000 passes, it was established that in this case Secugrid® 40/40 Q6 likewise more than met the demands made of it. Only 1 % elongation was measured in the working load area of the geogrid. As the results were so successful, the trials were continued under a higher traffic load corresponding to double that required by DIN 1072 (guideline for rating the load-bearing capacity of existing road bridges in the new federal German states into load classes). After a further 150,000 changes in load, the trials were terminated as

additional subsidence in the road surface was negligible. The elongation measured on the geogrid were at the end of the trials 2.5 %, therefore way below the approx. 7-8 % elongation at break of the product.



Secugrid® geogrid used to secure roads over subsidence areas

The large-scale tests proved that Secugrid® 40/40 Q6 can secure an overbridging of a subsidence area over a period of at least two weeks. Furthermore, the method is also advantageous when seen from a cost-efficiency point of view. ■

Impressum

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Schedule of shows and conferences 1st and 2nd quarter 2004

February

12.02.04 VSVI Seminar Geokunststoffe im Erdbau des Straßenbaus, Münster/Germany
17. - 20.02.04 Smagua 2004, Zaragoza/Spain

March

01. - 03.03.04 EuroGeo 3, European Geosynthetics Conference, Munich/Germany
11. - 12.03.04 11. Braunschweiger Deponie- und Dichtwandseminar 2004, Brunswick/Germany
18.03.04 11. Geotechnik Kolloquium, Darmstadt/Germany
18. - 19.03.04 Dresdner Wasserbaukolloquium 2004, Dresden/Germany

May

04. - 07.05.04 EurEnGeo 2004, European Regional IAEG Conference, Liège/Belgium