

BUILD

Leca[®]

A MAGAZINE FROM LECA[®]

Image courtesy of Transport Scotland



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OUR THREE STRATEGIC AREAS

In previous issues of BUILD, we have presented a multitude of diverse projects where Leca can be found. This represents the great versatility of our products. In this issue of BUILD, we've chosen to highlight this further by dividing the content into three chapters, showing the clear strategic focus of Leca. Buildings, infrastructure and water management. Many people have minimal awareness of the diverse applications available when using Leca lightweight aggregate, so we hope that this new approach will provide further education on our innovative material. This issue of Build provides exciting projects showcasing all disciplines.

BUILDING

In Finland, Poland and Norway, we have beautiful housing projects using Leca blocks. In Sweden we've built a huge firewall using different blocks. In Norway, our material was used to mitigate pressure against concrete walls in a big terrace block development. Furthermore, in Finland, Leca helped Lidl to build an innovative lighter construction.

INFRASTRUCTURE

In Scotland, Leca LWA was a key material for the development and construction of an eye catching bridge. In Denmark, the lightweight aggregate helped to minimize settlements and floodings, and in England, Leca enabled a tramway to be built on the top of highly unstable ground. In Portugal, we have been instrumental in renovating a major collapsed wall.

WATER MANAGEMENT

Providing clean water and creating solutions to flooding is maybe our most important task. In this issue we will highlight how our special product Filtralite purifies the waste water for more than half a million inhabitants in Oslo and in Sweden, how Filtralite handles storm water and removes phosphor. I am sure you will agree that our products offers innovations and solutions for the most diverse projects. We hope you enjoy.

Torben Dyrberg
Managing Director Leca International

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Text: Sampsa Heilä Photos: Jari Kesti/Studio Jari Kesti Ltd.

A BEAUTIFUL STONE HOUSE IN THE PEACE OF NATURE

FINLAND Mikko Merisaari and Lotta Halttunen utilised Leca® Design Sandwich Blocks to build a unique and economically efficient small house.



The white rendered stone house stands upright on a high slope at the edge of a forest.

The white rendered stone house stands upright on a high slope at the edge of a forest. The clean modern architecture and white solid stone surfaces continue throughout the interior of the property.

– We have been very pleased with our new home and the success of the entire construction project, says Mikko Merisaari.

Stone house was the most natural choice for a hillside plot

The couple came to the conclusion that the most natural alternative for this unusual location would be to create the most compact form of stone house as possible, along with a

basement, for which the same material could be used from the foundations up to the roof.

– We both like the clear, uniform surfaces, with good soundproofing typical of stone house architecture, says Mikko.

After thoroughly exploring the alternative stone options on the market, the couple came to their decision and selected Leca Design Sandwich Blocks.

Leca Sandwich Block’s advantages raised in comparison

– We considered 6–8 alternatives concerning both frame solutions and

contractors. Leca Design Sandwich Blocks, along with all its strengths and advantages, began to stand out quite rapidly from the crowd. Leca Blocks are easy to work with and easy to implement, says Mikko.

Energy costs less than one thousand euros per year

– A house made with polyurethane insulated Leca Design Sandwich Blocks is energy efficient and airtight. Based on the first winter and spring energy consumption readings, heating and electricity proved to be below one thousand euros per year.

A lightweight aggregate block, with closed cell polyurethane insulation, is highly moisture-resistant, compared to insulating material, such as porous heat insulation in a wooden house, where the air tightness is based on a thin plastic film. Leca blocks dry quickly, whilst the drying of concrete shuttering blocks, particularly when behind cavity drainage membranes beneath the ground, can take some time, says Mikko Merisaari.

Leca Finland’s professionals were the key to success

– Co-operation with Päivi Pöyhönen and Mikko Pöysti from Leca Finland went very well and they have always been ready to give advice and find the solutions that best meets our needs. Leca blocks are very flexible to build with and together with skilled builders the frame is rapidly erected.

Leca facts	
Facility	A single-family house
Location	Espoo, Finland
Frame contractor	Robert Rakennus Ltd.
Architect	Doventus Ltd/Architect Tero Seppänen SAFA
Leca products	Leca Design Sandwich Blocks



LOAD COMPENSATED FOUNDATION WITH LECA® LIGHTWEIGHT AGGREGATE ENABLES THE BUILDING OF A RECTORY ON WETLANDS

Text: Allan Dahl
Photos: Knud E. Jensen Fotografi and Architect Steen Kærsgaard

On a plot for a new rectory in Vesløs, near Thisted, geotechnical investigations found up to four metres of settlement-inducing soft soil, leaving the retained consultancy firm with the challenge of finding a good technical and financial solution to prevent future settlement. They chose a solu-

tion which included Leca LWA (10-20mm) coated as lightweight filling in a load compensated foundation.

Well known technique

Engineer Karina Jørgensen, from Erasmus & Partnere in cooperation with Christian Orbesen from GEOSYD

A/S, worked out a geotechnical solution by using Leca (LWA) filling:

– We have previously applied foundations on soft soil by means of loadcompensation using Leca LWA and it definitely turned out to be the perfect solution, explains Karina Jørgensen.



Leca facts

Project Vesløs rectory

Architect Steen Kærsgaard

Specifiers Erasmus & Partnere and GEOSYD A/S

Contractor Builder Benjamin Bislev

Leca products Leca 10-20

The finished house waiting for the spring and grass to come

One of our dedicated drivers making sure everything runs smoothly



The technique is simply based on equilibrium, meaning that you must not expose the subsoil to any increase in weight compared to the pre-existing load. In practice, this means that you replace heavy soil under the house by applying lighter Leca LWA filling until the unloading equals the load of the new house.

Christian Orbesen explains: – The load-compensated solution was suggested in order to reduce the loads on the actual settlement-sensitive deposits, which has unique deformation properties.

Karina adds: – We were unlikely to avoid settlements altogether, so we focused on limiting them as much as possible and ensuring even settlements for the entire building.

The solution was to place a reinforced concrete slab at the bottom for distribution of the settlements and build the actual load compensation with Leca LWA filling on top of that.

Easy installation when delivered by blowing truck

Easy installation and many added-value properties

Leca LWA was easy to install by the construction workers as the material naturally surrounds sewage pipes and other installations. The Leca LWA was blown through hoses directly from the truck to the building site at $1\text{m}^3/\text{min}$.

Contractor Benjamin Bislev, explains: – This was our first delivery of Leca LWA by pneumatic blowing truck and it went very well. I will not hesitate to use this innovative system in the future.

In addition to being a lightweight filling, coated Leca LWA (10-20mm) is also suitable as heat insulation; the material acts as a capillary-breaking layer and it also meets the requirements for side support of plastic sewage and drainage pipes.

Taking the excellent heat-insulating properties of the product and the thickness of the layer into account calculations show that the U-value will be as low as 0.08 W/mK for heat loss.



THE SOUND OF A STONE HOUSE

NORWAY Close to the seaside in Bergen lies a new stone house. "The owners wanted a house that looked great, but they also wanted the acoustics of a stone house," says architect Ove Grung, Grung Arkitektur AS.

Leca facts

Facility Detached house Kleiva

Builder Private

Entrepreneur Brødrene Foss
Byggmester AS

Contractor: Brødrene Foss Byggmester AS

Architect Grung Arkitektur AS, Ove
Grung and Ismael Derrida

The 300m² detached house lies just south of Bergen on the beautiful Norwegian west coast. The ocean view and the large glass windows facing the south east floods the house with natural light.

– The house is designed to blend in naturally with the terrain and amongst the other houses in the area. Despite its size, it is not dominating

or over powering, says Ove Grung. It soon became evident that the home owners wanted a modern, functional house made of stone with an effortlessly maintained façade. This was particularly important to them.

– They wanted large, pure surfaces both inside and out. At the same time, they also wanted a façade facing the sea and the sun, Ove continues.

Important sound

Working on the house, Architect Grung and the investor looked at houses in different styles.

– It was quite clear that they didn't want the tactility and acoustics of a wall made from render boards. They wanted something solid. It needed the right acoustics. The hollow sound of render boards was not an option.

The house is built using Leca Isoblock 30 lined with laths and isolated. Above the large glass surfaces concrete girders were used because of the span. In the roof there are timber roof trusses.



A facade facing the sea and the sun was important to the home owners Just as important was the feeling of a solid home. They wanted to avoid the sound of plasterboard, so they chose Leca Isoblock 30.



Architect Ove Grung and Jørgen Prestegård from Brødrene Foss Byggmester AS in front of the detached house.



They wanted the solid feel of a building utilising Leca Lightweight Aggregate (LWA) in its design, says the architect.

Leca Isoblock 30 was the obvious solution. On the inside, most of the walls were lined with laths.

– On the outside the house is rendered using Weber mortar. We spray rendered the facade, which was very

efficient and clean without lots of spillage, says Jørgen Prestegård from Brødrene Foss Byggmester AS, the building contractor.

The home owners wanted large glass surfaces which necessitated the installation of concrete girders as they can handle a heavier load than Leca blocks constructed girders of the same span. The roof is built using

wooden girders.

– Using Leca blocks has given us a very warm and cosy house that also stays cool on hot summer days. It has developed into a really great home where the owners thrive and all their wishes have been achieved, says Ove. – We are very proud of this project.



50 HOUSES AMONGST FIELDS AND FORESTS BUILT OF LECA® BLOCKS

POLAND Near the western border of Poland, amongst fields and forests, a housing estate of 50 family houses is being built with Leca® Blocks.

50 Houses built using Leca Blocks, located amongst fields and forests



Located in Karnin, on the outskirts of Gorzów Wielkopolski, the development includes 10 detached houses and 40 terraced dwellings. All of them are being built with Leca Blocks with load-bearing walls of 24 cm thickness, and partition walls of 12 cm thickness. Above the first floor of each property, Teriva ceilings are being laid, in which expanded clay, concrete hollow blocks have also been designed as a filling material.

Economy at the building site

When selecting the building technology that would provide comfort for the inhabitants, while reducing operational costs, the decision was taken to specify Leca Blocks. This highly energy efficient material has very good thermal insulation values, which is ideal



Leca Block houses provide comfort for the inhabitants and reduce house operating costs.

for maintaining temperature within the properties. Additionally, in order to cut transport costs, contact was established with a local manufacturer of expanded clay concrete products based on Leca Lightweight Aggregate (LWA), Prodbet Company from Karnin.

Production, deliveries, and the building process

– We started to manufacture expanded clay concrete products, including the Leca Blocks system elements in 2000. It took us several years to build a solid understanding of using Leca LWA manufactured in Gniew, and we gained valuable experience in the production of block manufacture, says Zofia Szwyndrak, the owner of Prodbet Company.

It was a big challenge for the Prodbet Company to complete deliveries and to assist in building the housing estate in Karnin. Due to the limited size of this building site, blocks could only be bought in small volumes so to maintain the continuity of the building works at the appropriate speed.

In order to accommodate an ongoing stream of supply, the manufacturer had to prepare an appropriate stock of blocks, and book sufficient storage at the plant. One of the big advantages was that the building site was situated nearby, which made it possible to use the means of transport to the optimum.

– Within just one day, we could complete several deliveries of materials using a single truck. My husband is a building contractor as well and he also built some of the dwellings on this housing estate. This is why we could finalise a number of organisational issues early in the working day, Zofia adds.

Presently some tenants are already living in their homes and others are moving in, while the rest of the houses remain under construction.

Leca facts

Facility Estate of 50 one-family houses

Location Karnin, woj. Lubuskie, Poland

Products Leca Blocks

Manufacturer of Leca Blocks products
Prodbet



LIVING AND WORKING IN THE HEART OF GIBRALTER IN THE COMFORT OF LECA® BLOCKS (ARLIBLOCK®)



Midtown, Queensway Road, Gibraltar.

GIBRALTAR, a small sovereignty at the southern tip of the Iberian Peninsula, has an area of around 12km². It is renowned for its hot and sunny summer climate and wet winters.

In the first phase of the Midtown Development in Gibraltar, which will deliver over 7,000 m² of premium office space, the requirement of acoustic and thermal comfort, as well as full protection against fire, was a major concern. To meet the brief designers specified Arlita Blocks (Arliblock) which will guarantee the requirements of the brief. Completion of this building is due 2018.

The next phase of the Midtown Development, which includes the stunning Liberty building, will offer a further 11,000m² of space, and will be available for purchase soon. With private parking available for the commercial offices and a convenient location close to the multi-storey car park, issues with parking that are synonymous with Gibraltar will become a thing of the past. With select restaurants, bars and eateries

located on the ground floor, a park and gym only a minutes' walk from the reception and a Main Street within a stone's throw, this will be a prime and greatly desired location in Gibraltar.

Presenting truly beautiful 1-4 bedroom apartments, as well as a number of breath taking penthouses, Midtown has been arranged to accommodate all aspects of modern life, and designed with careful consideration to the traditional values of a modern home. In addition to this, residents at Midtown will enjoy the tranquillity and urban sanctuary of private gardens and pool areas, splendid lobbies with dual high-speed elevators and concierge.

Enclosures and dividing walls with Arliblock, can be distinguished from prefabricated concrete blocks,

both lightweight and insulating, in which natural aggregates have been replaced by lightweight aggregates of Arlita LWA. The Arliblock is part of a system for building load-bearing and non load-bearing enclosures, and its selected granulometry has enhanced its mechanical strength and lightness, while offering excellent thermal, acoustic and fire resistant performance. This construction system has all the necessary technical elements to avoid the specification of any other material of a different nature to that of light Arlita LWA.

In addition, the shape of the block, its size and design and the number of air chambers, provides the Arliblock with all the fundamental requirements for a strong and safe construction.



Views of the building
under construction.

Advantages compared with other materials:

Air chamber: with different formats, sizes and quantity depending on the desired performance.

Surface: more porous than conventional concrete, guaranteeing excellent adhesion.

Tongue and groove: in the vertical joint for a dry installation without mortar, provides a mechanical fit that allows for faster construction and significant cost savings.

Blind base: its solid finish on the bottom prevents, when placed inverted, the amount of concrete required.

Lightweight: between 30-50 % lighter than a conventional concrete block, as a result of replacing natural aggregates with Arlita LWA.

Building before the placement of Leca blocks.



Leca facts

Main contractor Gibraltar Joinery and Building Services LTD

Architect Marc Roberts from Loveblock Mitchel Architects –Chester UK.

Leca Blocks® (Arliblock®) Contractor: Prefabricados Level 2009, S.AA

Arliblock® 25 Thermal-Acoustic Solution = 120.000 units

Arliblock® 19 Acoustic = 100.000 units

Arliblock® Multichamber 25-30-3C = 5.000 units

Arliblock® Multichamber 20-30 = 35.000 units

Arliblock® Solid = 32.000 units



One of three blocks being built in Hokksund by Betonmast Telemark.

At Harakollen in Hokksund they are now building a brand new residential area. The project is being constructed by Betonmast Telemark and developed by Harakollen Terrasser AS. The new terrace blocks are the largest project in the development of the hill. The blocks lean elegantly against the neighbouring mountain wall and there are great views of the Drammens river below. But the construction of the blocks against a mountainside generates problems. – They are constructed incrementally

against the mountain side. Because of this we get a void between the mountain and the block. You can imagine what will happen if stones were to come loose at the sixth floor, says Eivind Berge, project manager in Betonmast Telemark. Contractor Betonmast Telemark prefers using Leca LWA when filling voids of this type.

Combination

– A heavy product would create pressure against the block wall. The most

important thing is that the fillings are light, but it is the combination of properties that makes Leca LWA attractive to us, continues Eivind.

The unique drainage properties of Leca LWA are important - as well as the final overall cost of the development.

Betonmast have utilized huge amounts of Leca LWA for this project as every floor leaves a void that requires filling. Nils Kristian Naug of Harakollen Graveservice understands



IDEAL FOR APARTMENT BUILDINGS

NORWAY Betonmast Telemark uses Leca® Lightweight Aggregate (LWA) when filling voids between the mountainside and the walls of Harakollen Terrasser.

Text and photo: Kim Fjeldberg



To get to the voids of the building, it is necessary to walk steep hills and into narrow passages. Blowing Leca LWA is a much better alternative.

the key benefits of specifying Leca LWA for the fillings. – Workers on site need to walk steep slopes and into narrow passages to do their job and working with a lightweight product

like Leca LWA is a huge advantage.

– Leca LWA is incredibly easy to handle. Today we take a full delivery of 50 m³ of Leca LWA. It only takes

about two hours to blow the material into position. Both rock aggregate and other competing products are a lot heavier and more time consuming to work with, says Naug.

The third and final building phase of Harakollen Terrasser is expected to be finished around December 2018.



Nils Kristian Haug appreciates how easy Leca LWA is to handle.



Eivind Berge, Project Manager at Betonmast Telemark.

Leca facts

Facility Harakollen

Builder Harakollen Terrasse AS

Investor Betonmast Telemark AS

Products Leca Iso 10-20



CONSTRUCTING A 1000 M² FIREWALL FOR NEW COOP GROCERY STORE WITH LECA[®] BLOCKS

Leca facts

Facility Coop, grocery store

Location Falkenberg, Sweden

Contractor MVB Astor Bygg AB, Halland

Leca products 1000 m² Leca Murblock 15 and Leca Isoblock 2.0 30

SWEDEN Next to Lantmännens factory, the Swedish grocery chain Coop has a new store under construction in Falkenberg, Sweden. Contractor MVB Astor Bygg AB was awarded the contract and was tasked to develop a large firewall for which Leca Lightweight Aggregate (LWA) has been specified.

Firewall: One of the wall facades measures 50 metres

Text: Caroline Hanner Photos: Caroline Hanner & Krister Nyman



Magnus Eskilsson, who is a site foreman, shows us around the building site.



The builders have had a positive experience of constructing the firewall.

The building design includes a firewall and as Leca LWA is a non-combustible material with good fire resistant properties, Leca Murblock and Leca Isoblock 2.0 were specified for the firewall. The wall itself is a large construction, one of the wall facades measuring fifty metres long by approximately nine metres in height.

A positive experience

Magnus Eskilsson, who is a site foreman at MVB Astor Bygg, has extensive experience of working with Leca LWA and reports that the builders have had a positive experience of constructing the firewall using Leca LWA, especially Leca Isoblock 2.0. – The Leca block is very stable and much lighter than other blocks, so it does not require as much effort to

manually lift them. This makes the job much easier, faster and far more comfortable for the site workers, says Magnus.

By specifying Leca Isoblock the building also benefits from gaining an insulated exterior wall that meets current fire safety regulations, and this is just one of many properties gained through utilizing Leca LWA. The part of the firewall that is adjacent to another building has been built with Leca Murblock since the requirement for insulation was different. Magnus continues: – We enjoy using Leca LWA. Heavy walled structures built with Leca LWA require little maintenance and are quick and easy to install, so you do not need to worry that you have to return after a few years and invest more time and expense in maintenance.

LECA® LIGHTWEIGHT AGGREGATE CONTRIBUTES TO BALTIC SEA SCIENCE CENTER IN SWEDEN

SWEDEN On the island of Djurgården in Stockholm the construction of a new and innovative building is now taking place and Leca Sweden is one of the companies that are sponsoring the project with a supply of building material.



Text: Caroline Hanner/William Frieberg
Illustration: Topia/KAWA

When the construction is complete the facility will serve as a knowledge centre for the Baltic Sea.

Leca facts

Facility Baltic Sea Science Center at Skansen

Location Stockholm, Sweden

Contractor SH Bygg

Leca products 1700 m³ of Leca LWA 12/20

A knowledge Center for the Baltic Sea

The project is a partnership between Skansen, an open-air museum and zoo that is located on the island Djurgården in Stockholm, and BalticSea2020, with the purpose of improving the opportunities for the Baltic Sea to become more viable in the future.

The Baltic Sea Science Center gives visitors an insight into the condition of the Baltic Sea below the surface, and what we can all do to improve it. The facility will serve as a knowledge centre with exhibitions, aquar-

iums, lesson halls and laboratories. Projects will be action-oriented and innovative, and contribute to a healthier Baltic Sea. The foundation also works to spread knowledge and information about the Baltic to decision makers, authorities, schools and individuals.

Leca Sweden contributes Leca LWA

Leca Sweden is one of several Saint-Gobain companies who have contributed material for this project. Leca LWA has mainly been used as a back filling material between the rock wall and the building. Moreover, the material also insulates parts of the

structure and the Leca LWA constitutes part of the foundation beneath the concrete plate.

The delivery of material began in September 2017 and took place over several subsequent deliveries. In total around 700 m³ of Leca LWA was quickly blown in to position using one of the company's spectacular pneumatic blowing vehicles.

The construction has been in progress for over a year and is expected to be complete for the opening in Spring 2019.



Lightening structure of the field and water supply lines.



Text: Sampsä Heilä

Photos: Lidl Suomi Ky & Sampsä Heilä

LIDL'S NEW ENVIRONMENTALLY FRIENDLY DISTRIBUTION CENTRE

FINLAND Environmental values guide the construction of Lidl's third distribution centre. Environmentally friendly and cost effective Leca® Lightweight Aggregate (LWA) was selected for the lightweight structures.

In the construction of a distribution centre in Järvenpää, measuring 60,000 m² and costing EUR 100 million, special attention has been paid to environmental sustainability. The aim is to build the most environmentally friendly distribution centre in the Nordic region. Lidl are hoping to apply for BREEAM environmental certification and to achieve an ambitious 'Excellent' rating.

More distribution center capacity

– We will open dozens of stores in southern Finland in the coming years. We need additional distribution centre capacity to maximize deliveries of products seven days a week, says Virpi Kaikkonen, Lidl's Real Estate and Development Director.

– Leca LWA is used to compensate for the difference in displacement as a transition wedge structure when moving from a stabilized concrete slab-covered loading area to a non-grounded area. Another location

requiring a light weight structure to prevent settlement is along the city's light traffic passage through the area, which will become around one metre thicker than the city had planned before the Lidl project, says Project Manager Risto Riisö from Geotek Oy. Approximately 6,500 m³ of Leca LWA will be used.

Most economical lightweight filling material

Site Manager Antti Saikkonen from Graniittirakennus Kallio Oy says that the company utilizes digital control in all of its machines, which enhances efficiency and accelerates the completion of work.

According to Saikkonen, the contractor specified Leca LWA after studying various alternative options for the light weight structure. Leca LWA was finally selected as extensive research found that the material could effectively achieve the specified engineering requirements for this project.

Punctual deliveries were the key to success

– With the use of Leca LWA, it is important that deliveries arrive within scheduled time frames and to the exact place in which the loads are to be delivered. There is no need for intermediate storage which would only increase costs and requires additional space. The operation with Leca Finland and the relevant logistics have worked well, Saikkonen says.

Leca facts

Facility LIDL distribution centre

Location Järvenpää, Finland

Specifier Geotek Ltd.

Main contractor Fira Ltd.

Construction contractor Graniittirakennus Kallio Ltd.

The amount used 6500 m³

Leca products Leca Lightweight Aggregate (LWA)



Illustration of the distribution centre.



On Damasceno Monteiro Street, a collapsed retaining wall required urgent reinforcement and re-construction.

STABILISATION OF A COLLAPSED WALL IN LISBON

PORTUGAL On Damasceno Monteiro Street, a collapsed retaining wall required urgent reinforcement and re-construction.

Text: Special thanks to Eng. Gonçalo Lopes
Photos: Mário Silva e JETSj

The reconstruction project was carried out by H Tecnic - Construções, Lda, through HCI - Construções SA, who were awarded the contract by the Lisbon City Council. The project used 830 m³ of Leca Lightweight Aggregate (LWA). Drainage capacity, strength and ease of use of Leca (LWA) was responsible for the success of this project.

On February 27, 2017, the collapse of the upper zone of the wall occurred

followed, by a landslide. What led to the collapse of the wall is still unknown, however, the main causes could have been the water supply and/or poor drainage. The inefficiency of the drainage system may have led to an increase in the hydrostatic pressure exerted on the wall and consequently the increase of the horizontal loads.

The reconstruction of the collapsed wall, with an extension of 25 m, aimed

to give continuity to the entire front façade of the adjacent walls. The new wall was built at a height of 2 m, to which reinforced concrete slabs were attached. The landfill was made with Leca LWA and wrapped in a geotextile blanket to prevent compaction.

– Considering the logistical difficulty of stabilising a large wall, it was decided to fill the gap between the new wall and the existing slope with a lightweight aggregate, in order to



Finale stage of the project.



Gonçalo Lopes, Civil Engineer responsible for the project.



The gap between the new wall and the existing slope was filled with Geo Leca.



Finale stage of the project.



Alexandre Pinto, Civil Engineer responsible for the design.

reduce pressure and to increase the drainage conditions, explained the designer Alexandre Pinto, from the design company JETsj.

Ease of application exceeded expectations

Gonçalo Lopes, the civil engineer responsible for the project, already had experience with Leca LWA in other types of geotechnical projects, but in smaller volumes. – Leca LWA has so far exceeded expectations in ease of application. The urgency of the work required quick and effective measures in place, and in this respect Leca LWA met all the required

expectations. Delivery of the material also went well; there were never any delays.

For Alexandre Pinto, Leca LWA is a very interesting solution in geotechnical works since it offers at least two characteristics which are very important for this type of work: low weight and high permeability. Drainage capacity and ease of placement and installation on site were the main reasons that led Pinto to choose Leca LWA in other solutions.

Given the constraints of the project, primarily limited and difficult access,

- the work was carried out with the assistance of a high capacity crane which was used to suspend the Leca LWA bags on the landfill where the material was required. This process contributed to the speed and efficiency of the completed project.

Leca facts

Designer Company JETsj

Contractor H Tecnic – Construções, Lda / HCI – Construções SA

Leca products Geo Leca



LECA® LIGHTWEIGHT AGGREGATE ALLOWS SCHEDULES TO BE KEPT IN KEMPELE

FINLAND *Leca LWA was selected as a lightweight fill for the construction of a motorway section at Zatelliitti.*

Text: Mirja Rintala Photos: Marko Jelonon & Ville Honkonen

The material allowed for budgets and schedules to be kept as planned. Worksite Manager Marko Leppänen, from YIT Corporation, says that the flexible transportation by 35 full trailer blowing vehicles was an essential part of the project's success in terms of scheduled completion.

The work at the Zatelliitti Business Area is part of a major renovation project of Highway 4 linking Oulu and Kemi. Highway 4 is one of Finland's main highways and its improvement includes work sites in Kempele, Oulu, Ii and Simo.

The new interchange to Kempele will improve the flow and safety of traffic, as well as accessibility to the area. The main contractor of the project is YIT Corporation. This project is planned for completion in November 2018.

The plan for this huge geotechnical project includes ramps which are to be built from the Zatelliitti interchange to the motorway. There will be four bridges for the interchange; roundabouts to the Zatelliittintie and Kokkokankaantie connections; covered public transportation stops and a transverse light traffic connection

under Pohjantie, towards the municipal centre of Kempele.

It also functions as frost insulation

Planning Manager Sakari Lotvonen, Pöyry Finland Limited, considers Leca LWA to be an excellent alternative to heavier aggregate material for the Kempele site. It will lower the total weight of the fillings and prevent road settlement.

– The benefit provided by Leca LWA includes its light weight characteristic and the ease of delivery method. It also works as a transition structure and provides frost insulation, Lotvonen explains.

The geotechnical project for Kempele will cost approximately EUR 10.5 million. Along the stretch of motorway, an old light traffic bridge was dismantled and the backfill was replaced by Leca LWA to lighten the structure.

– Around 5,000 m³ of Leca LWA was used. It was transferred from the Kuusankoski factory in 120 m³ loads. We have not used Leca LWA in such big quantities before. The project ran smoothly and progressed according to schedule and budget. The quality

The work at the Zatelliitti Business Area is part of a major renovation project of Highway 4.



of the material and its efficient delivery was greatly appreciated, says Leppänen.

A sturdy base in half-metre layers

For the bridge development at Susikorpi, there was a requirement to use lightweight structures to prevent and restrict road depression when filling in the bridge excavations. Leca LWA was installed at the work-site between the embankments so the foundation was sturdy and very supportive.

– Leca LWA was removed from each vehicle and placed into a pit, and a digger spread the material into layers about half a metre in depth. The

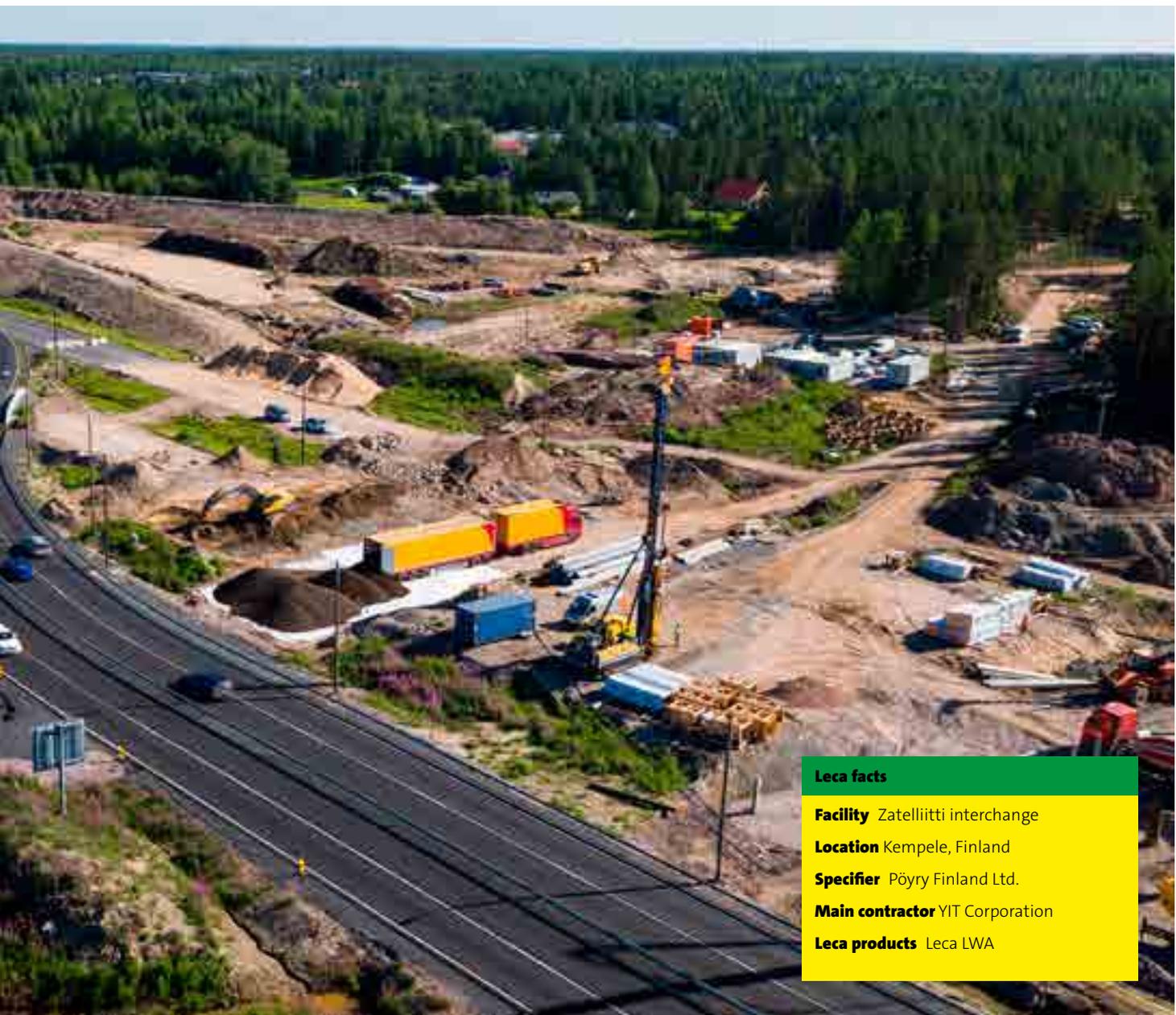
layers were compacted by driving an excavator over the top, explains Leppänen of the work carried out at Kempele.



The lightweight structure was compressed in approximately 0.5 m layers.



Lightweight structure for new lanes on the motorway



Leca facts

Facility Zatielliitti interchange

Location Kempele, Finland

Specifier Pöyry Finland Ltd.

Main contractor YIT Corporation

Leca products Leca LWA



Text: Knud Mortensen
Photos: Knud Mortensen



NO MORE SETTLEMENTS AND FLOODS

DENMARK On Vinkelvej, a road near Viborg in Denmark, an age old problem with settlements and floods was solved by filling the underside of the roadbed with Leca® Lightweight Aggregate (LWA).

They used to dig peat in the river valley where Vinkelvej intersects the Nørreå stream in the town of Viborg. Due to the peat production, an interim road leading to the area was constructed at the time and it has since then been extended and maintained through gravel and stone material.

Every year the combination of soft soil and the weight of the supplied gravel and stone material has been a

real challenge for the Viborg municipality in the form of settlements. Consequently, they have had to close the road for long periods of time because of floods from the surrounding bog.

Load compensation solution

In 2013 it was decided to repair this stretch of road. The old road was removed and a preloading was carried out. After 18 months, settlements as high as two metres were

measured. Therefore the preloading was removed and replaced with Leca LWA filling, a so-called load compensation where heavy material is replaced by lighter material in order to reduce the pressure on the subsoil, and thus reducing settlements. The thickness of the Leca LWA filling was up to three metres and, during the installation, the excavation was kept dry in order to ensure good compaction. Finally, a traditional road construction was



The updated road going through the bog.

Leca LWA tipped directly into the excavation and easily distributed

established. However, not everything went as planned. Benny Taul Bjerre from the specifier Viborg Ingeniørerne A/S explains:

– A series of unfortunate circumstances during the construction made the road settle a little more than calculated. When the excavation was at its deepest a thunder shower filled it with water causing a saturation of the subsoil. However, we have continuously monitored the settlements

on the road and have observed no problems so far.

Experiences with the solution

A Leca LWA solution was chosen because Benny Taul Bjerre and GEO Aarhus had good experiences from a number of previous, geotechnical projects where load compensation with Leca LWA had been applied. The Leca LWA was tipped straight off the lorry into the roadbed bottom, which Benny Taul Bjerre described as a simple and easy method of delivery. Contractor Søren Glintborg Vils from Vils Entreprenørforretning A/S was also pleased and compliments:

– It went extremely well. The trailers were tipped off first and parked. After that, the lorries themselves were tipped off. Our wheel loader subsequently distributed the Leca LWA. The wheel loader had extra wide tyres so it took no time at all. Søren described the construction of

the road as an exciting task with challenges caused by the thunder shower that struck during the construction. Since then he has passed by a few times and been able to ascertain that the road functions well. In the three years since the completion of the road, no significant unexpected problems with floods or settlements has occurred.

Leca facts

Project Flood protection of Vinkelvej

Client Viborg Municipality

Specifier Viborg Ingeniørerne A/S

Contractor Vils Entreprenørforretning A/S

Leca products Leca 10-20



Courtesy of Transport Scotland

Queensferry Crossing
from north viewpoint.

THE QUEENSFERRY CROSSING – THE NEWEST ADDITION TO SCOTLAND’S FAMOUS FORTH BRIDGES

UNITED KINGDOM *Leca Lightweight Aggregate (LWA) was selected as a key material for the development and construction of the new Queensferry Crossing, the new road bridge in Scotland. The 2.7 km-long bridge now links Edinburgh and Fife.*

Text: Johnny Tse
Photos: Transport Scotland

The Queensferry Crossing, which is the longest three-tower, cable-stayed bridge in the world, and also the largest to feature cables which cross midspan, officially opened to traffic on 4th September 2017.

5,500 m³ of Leca LWA (10-20 mm) was used in the reinforcement of the

bridge’s supporting structure on the north side of the Ago. Leca UK supplied the lightweight aggregate used to raise part of the existing Ago main-line levels and widening westwards.

The traditional solution of directly placing conventional fill materials on the existing Ago, and the adja-

cent ground, would have incurred additional loads on the soft peat and underlying alluvial materials. This consequently would have resulted in unacceptably large settlements, as well as causing environmental and sustainability issues.

Leca LWA’s density is around 25 %



Leca LWA was used to raise and widen part of the existing A90 mainline levels.

of that of conventional fills, so the team opted for excavating the existing ground to a depth that allowed for replacement and filling up to the new design level. This resulted in a net load of zero being applied to the underlying soft strata, which ensured that the post-construction settlement was kept to a minimum and differential settlement issues compensated for.

Leca LWA brought additional short and longterm benefits, such as significant time saving in the construction process, which resulted in minimal disruption and delays to existing road users. This came with environmental benefits as congestion and vehicle emissions were reduced.

The team opted for excavating the existing ground to a depth that allowed for replacement.

Leca facts

Facility Queensferry Crossing

Location Scotland

Application 5500 m³

Consulting Engineer

1. Grontmij (External)
2. Forth Crossing Design JV Design joint venture comprising Sweco (formerly Grontmij), Gifford, Ramboll, and Leonhardt Andra and Partners, on behalf of FCBC

Contractor Forth Crossing Bridge Constructors JV (FCBC), a consortium of Hochtief, Dragados, American Bridge International and Morrison Construction.

Product 10-20 mm



Courtesy of Transport Scotland



During repair works, some very difficult ground conditions were often encountered.

MULTIPLE HIGHWAY SOLUTIONS WITH LECA® LIGHTWEIGHT AGGREGATE

POLAND *Developing a complex infrastructure project, such as a motorway, not only includes the actual road itself, it also involves geotechnical disciplines such as bridges, tunnels, service roads, drainage and lighting systems and many other facilities.*

In addition to the road of two, four or more traffic lanes, sometimes it is more difficult to build these additional facilities than it is to build the road itself.

Świnoujście is the biggest port in Poland that not only handles passenger ferry traffic but is a large and busy commercial port where bulk goods and containers are frequently loaded and unloaded. At the same time Świnoujście and the nearby

Międzyzdroje are also popular seaside resorts which attracts visitors and traffic. People and goods are mainly coming here from southern Poland, as well as from neighbouring countries such as Germany, Ukraine, Czech Republic, Slovakia, Hungary, and Austria.

When repairing a section of the heavily loaded road S3 near Międzyzdroje, some very difficult ground conditions have frequently

been encountered. The three-fold application of Leca LWA offers an instrumental solution to the overall performance of the project.

Road and bridge joints

The design solution for the main roadway required piling. In order to avoid having to build heavy embankments in delicate areas of the road and bridge joints, and to avoid the number of pilings, the decision was taken to build road and bridge joints



Road and bridge joints built with Leca LWA



It was necessary to build several service roads.

Electric cables laid in the geotextile filled with loose Leca LWA.



over Leca LWA. The Leca LWA material was placed quickly and efficiently and then compacted using simple compacting equipment. The entire filling material was covered with a geotextile which made the embankment even more robust and durable and formed the platform on which to build the road itself.

Service roads

In the area of the bridge, it was necessary to build a number of short service roads to accommodate access to the repair facility, as well as access to the adjacent agricultural land. In the difficult peat ground, excavations required the road to be dug, Leca LWA placed and wrapped in geotextile,

and then the pavement constructed. By removing the heavier peat and replacing it with Leca LWA, which is stronger and lighter, it was possible to build and operate roads more safely, efficiently and economically.

Electric power cables

In the area of the bridge, it was essential to lay lighting systems and power cables. If these cables were laid directly into the peat ground they would sink, while heavy cables tend to easily score through the peat resulting in broken terminal connections. In order to prevent this, bags filled with Leca LWA were placed inside excavations which created a floating foundation cushion, upon which cables

were laid in the geotextile filled with loose Leca LWA. The entire construction had a larger supporting surface than the cable itself and therefore it did not sink into the ground.

Project details

- Location** Międzyzdroje, Poland
- Investor** GDDKiA Department in Szczecin
- Design** Transprojekt Gdański, Department in Szczecin
- Geotechnical design** Geotechnika, dr inż. Jerzy Rzeźniczak
- Contractor** Hermann Kirchner Poland
- Leca products** 4,500 m³ of Leca KERAMZYT 10-20 mm



ACCESS TO A RESTRICTED COURTYARD DEVELOPMENT

UNITED KINGDOM *Leca Lightweight Aggregate (LWA) solves the problem of a landscaping project in a Warrington courtyard development*

Text and photo: Johnny Tse



Leca® is a registered trademark owned by Saint-Gobain

It was discovered that there were access limitations to the courtyard.



In a major geotechnical project in Warrington, north west England, in which it was originally proposed to install crushed concrete (MOT/6f2) aggregate to create a foundation for a courtyard in a new development, it was discovered that with access limitations crushed rock aggregate would not be appropriate. It would result in the material being barrowed through the residential property and pose a serious risk to the development.

Scott Raftry, Operations Manager at DWM Plant Limited, said: – We needed to install backfill material in an internal courtyard after the completion of a residential nursing home. Using MOT/6f2 would have required serious lifting capacity and a large crane to place the excavator and move the material around within the courtyard. This was unworkable and we had to consider other alternatives.

Over 120 m³ of Leca LWA (10-20 mm) was delivered to site in three deliveries onto a difficult to access residential area. This particular project would have required an additional eleven deliveries to carry the proposed crushed concrete. This reduction in CO₂ emissions, man hours, and associated costs provided essential protection to the surrounding environment as a result.

Capable of carrying an average of 55 m³ per load using Leca’s pneumatic blowing delivery was ideal for this project. The vehicle was able to blow to a distance of 40 metres allowing the Leca LWA to reach the central courtyard with ease, allowing for greater flexibility, aiding the environmental considerations to a variety of access and constructional challenges.

Scott Raftry comments: – Leca LWA was very easy to install with minimal man power, saving us considerable time and labour. The success of this project has meant that we will always consider Leca LWA for this type of project in the future.



Alternative material would have required a crane.



Crushed rock aggregate would have posed a serious risk.

Leca facts

Facility Care Home Development

Location Warrington, England

Application 120 m³

Contractor DWM Plant Ltd

Leca Product Leca LWA 10-20 mm



Using traditional materials over unstable ground would have led to differential settlement.

LECA[®] LIGHTWEIGHT AGGREGATE TAKES THE STRAIN FOR THE METROLINK AIRPORT LINE EXTENSION IN MANCHESTER

UNITED KINGDOM *The extension of the Manchester Metrolink tramway to Manchester Airport relies heavily on the load bearing qualities of Leca LWA to provide a strong, stable support for the tram line where it passes over water courses, unstable alluvium, reclaimed land and the M60 motorway.*

Text: Leca UK
Photos: Leca UK

Leca LWA provided a strong, stable support for the tram line.



The 14.5 km (9 miles) extension created a new public transport corridor for the western side of south Manchester, between the A56 Chester Road from Altrincham and the A5103 Princess Parkway. Linking central Manchester, Old Trafford, Chorlton, Wythenshawe and Manchester Airport greatly improved access to areas south of the River Mersey. Leca LWA was specified for use on three of the projects within this ambitious transport investment. A trackway span was built over the Chorlton Platt Gore water course which necessitated excavation of the existing bank of the brook to allow for this construction. Using traditional materials over the underlying alluvium and unstable ground would have led to differential settlement

between the solid structure and the embankment so resulting in a three month predicted delay to allow for consolidation. To accelerate the programme, and alleviate this potential delay, Leca LWA was used to backfill the structure.

The embankment was constructed over the eastern flood plain of the River Mersey. Leca LWA was specified to help minimise the size of the piled foundation slab and mitigate the effects of long term differential settlement of the embankment while simultaneously supporting the track bed over a large area of alluvium. This was required to provide sufficient width for the new tram line and its platforms.

The main contractor for the civil engi-

neering work in this major design and build project was M-Pact, a joint venture operation between Laing O'Rourke and Volker Rail. James Oliver, Project Manager for Laing O'Rourke, was very positive on the values of Leca LWA. – We carried out a commercial cost assessment of the materials available and proposed Leca LWA at the design stage. The material proved very practical to place into position, is easy to compact accurately and, overall, it was easy to handle. A sterling job was done on the logistics which is always variable on a project of this magnitude. It can so easily be affected by weather and related construction schedules but the Leca UK team worked with us excellently to get material to site on time, even at short notice.



Leca LWA was specified to provide a strong, stable support for the tram line.

Leca Facts

Facility Manchester Tram Line

Application 2720 m³

Consulting Engineer Jacobs Engineering

Contractor M-Pact (JV between Laing O'Rourke and Volker Rail)

Leca product Leca LWA 10-20 mm



A PURER OSLOFJORD USING FILTRALITE®

Text and photo:
Kim Fjeldberg

NORWAY Vestfjorden Avløpsselskap (VEAS) uses Filtralite® to
cleanse the waste water from more than 600,000 people.



One of six process halls at the VEAS facility

A basin is filled with brand new Filtralite
to do wear testing of the product.

Leca facts

Location Filtralite at VEAS

Builder VEAS

Products Filtralite HC 2,5-5 and HR 3-5



Senior project manager
Øystein Moursund.



Process engineer
Pia Ryrfors.



Crushed Filtralite
used as a filter at VEAS.

Hidden in the mountains of Bjerås in Asker municipality, the VEAS-facility is Norway's largest waste water treatment plant. VEAS treats the water in regions of Oslo, the whole of Asker and Bærum, and also regions of the Røyken and Nesodden municipalities. The plant cleans the waste water from about 12 percent of Norway's population. Additionally, VEAS produces biogas and fertilisers for agricultural use.

Started at VEAS

One of the steps in the cleaning process is filtering through Filtralite. Already in 1993, VEAS began testing new ways to filter waste water. The purpose was to reduce the size of the facility. A lot of products from many companies were tested including Leca Lightweight Aggregate (LWA).
– The original filters demanded a lot of space. There was no room for expansion inside the mountain, so we needed to find filters that were more efficient and much smaller, says process engineer Pia Ryrfors. Most of the materials tested were rounded, as was Leca LWA.
– The irony is that crushed Filtralite was tested to prove the efficiency

of regular Filtralite. The results were quite unexpected. Crushed Filtralite turned out to be more than 50 percent more efficient than its rounded counterpart, says Pia.

Large surface

Because of the large surface area of the crushed material, sludge and particles stick easily. The porous cavity in Filtralite is also a good habitat for bacteria to do a thorough job cleansing the water while bacteria saves VEAS from cleaning the filter. Also, the cavity ensures good distribution of air, which is important to the well being of these bacteria. – Filtralite has a combination of features that make it a unique filter material, Ryrfors explains.
– There's more than 14,000 m³ of Filtralite in the VEAS facility.

Testing durability

In the winter of 2018, VEAS will once again test Filtralite, this time to examine the efficiency of the material over a period of time.
– For us, Filtralite is an amazing product. But we don't have any specific data on the efficiency of

Filtralite over time, explains senior project manager Øystein Moursund.
– Filtralite also proves to be a strong material. When VEAS first utilized Filtralite it was assumed that some wastage would occur. The filters are cleaned regularly and parts were expected to break and wash away, but after nearly 25 years of experiencing the use of Filtralite, it turns out the wastage is only between one and two percent, he continues.

This is the reason they are still using the original Filtralite since 1993. It also shows the need for the tests we are about to run. We need more specific insight into how much wear the product has actually suffered, so we can get a better estimate of the filters, life cycle. The purpose is to show the effect of wear and tear on the efficiency of the material, says Moursund.

Filtralite has been recognised all over the world, and is now distributed globally.

– VEAS is very proud to have contributed to the development of a product recognised throughout the world, Øystein says.



FILTRALITE® PURE DENITRIFICATION BIOFILTER AT FORMICHE ALTO (SP)



Panoramic view
of Formiche Alto
(Teruel Province,
Spain).

Biological denitrification involves the biological oxidation of organic substrates in water treatment using nitrate or nitrite as the electron acceptor instead of oxygen. In a Drinking Water Treatment Plant, denitrification is carried out in just one step inside an anaerobic bio-filter filled with the filter media Filtralite Pure which is the optimum carrier for the denitrification biofilm. The system is simple to design, very reliable, highly performant and with low operational cost.

Designing a denitrification biofilter with Filtralite Pure

In 2017, Ingeobras designed and built in Formiche Alto in the Teruel Province of Spain a denitrification biofilter with Filtralite Pure as the biofilm carrier. The Drinking Water Treatment Plant (DWTP) effectively treats the groundwater with good quality except for the nitrate content which is around 60ppm. Content can be variable depending on the season.

A small drinking water treatment scheme (5m³/h) was built in four steps:

- 1** Denitrification Bio-Filter Anaerobic to remove nitrates
- 2** Physical Filtration to remove Suspended Solids
- 3** Biological Aerated Filter to remove remaining organic matter
- 4** Disinfection with Chlorine

The DWTP of Formiche Alto has been designed to operate with a removal performance of 60% to get a final NO₃ value in the outlet water below 25ppm. The quantity of backwash water needed is between 5-10% of the total

SPAIN The process of denitrification in the field of drinking water treatment is a big challenge today. Contamination of aquifers by nitrates, due to the excess of fertilization in agriculture, is a recurrent problem throughout the world and especially in regions with important agricultural development, such as Mediterranean Europe. Biological denitrification is a very reliable and effective solution for drinking water treatment.



View of the small plant with the sedimentation tank outside.

filtered water produced. The plant has an automatic operation which reduces the operational costs. Additionally, the filter media Filtralite Pure, which is at the heart of the system, has a lifespan of over 20 years.

The project's CAPEX to build up the DWTP is, in comparison with other solutions such as reverse osmosis, electro dialysis, distillation or chemical reduction, substantially lower because of the simplicity of the technology used. Biological denitrification in DWTP removes between 70–95% of

nitrates and is proven to be the most efficient of all technologies. Removal obtained with ion exchange, chemical reduction, electro dialysis and reverse osmosis were 80–90%, 33–90%, 30–50% and 50–96%, respectively.

Denitrification solution in a water drinking plant using Filtralite Pure in a biological filter is an excellent option, in terms of water quality, CAPEX and OPEX. The process is very robust and reliable with a strong component of economic and environmental sustainability.



Leca facts

Project DWTP of Formiche Alto (Teruel Province -Spain)

Type of Facility Drinking water treatment plant

Pollutant 60 ppm/l of NO₃

Operational Cost It's estimated, by Ingeobras, that for a DWTP designed to treat NO₃ (60ppm/l) with a daily flow of 1000m³, the total operational cost is around 0.16 €/m³ with the following cost breakdown:

- 0.08 €/m³ for reagents (mainly organic matter)
- 0.04 €/m³ for energy
- and 0.04 €/m³ for maintenance

Flow Treated 5 m³/h

Type of Technology used Anaerobic Denitrifying Filter + Biological Aerated Filter

Product Filtralite Pure HC 2,5-5



ODOUR TREATMENT FILTER IN BIOGAS PLANT



DENMARK Applying Leca Lightweight Aggregate (LWA) in a biological odour treatment filter is a simple and effective solution, allowing nature's own bacteria to handle the purification.

Nature Energy Nordfyn is a biogas plant near the town of Bogense, Funen, which treats approximately 300.000 tons of biomass per year.

Opened in 2016, it comprises of a biogas plant for degassing biomass and an upgrading plant, purifying the raw biogas so it can be brought to the consumers via the existing natural gas grid.

Why Leca LWA in odour treatment filters?

As a filter material for the biological odour treatment of the plant, Leca

Denmark A/S has supplied 750 m³ of Leca LWA (10-20 mm). The advantages of the product are:

- The air volume/percentage of voids between the grains is large, between 40-45 %, therefore the air will come in contact with a large surface area where the odorants can be removed. The air volume distributes itself as a network of air-filled passages between the Leca LWA grains.
- The pressure loss through the product is considerably lower than for finer grading's due to the size of the air-filled passages. This is important as the filter treats 40,000 m³ air/hour. The lower

the pressure loss, the lower the energy requirement for moving the air.

- The coarse grading provides more room for biofilm and air movement so that the filter does not clog.

How does it work?

The principles of biological odour treatment with Leca LWA are as follows:

When cleaned, the odour-filled air is sucked or pressed through the water-humidified layer of Leca LWA. After a few weeks, a large amount of nature's own bacteria, which feed on the nutrients in the odour-filled air, will



The 'Nature Energy Nordfyn plant with three biogas reactors on the left, and the odour filter in front (with the white lid.)

Filling of the odour treatment filter. The pipes on top are the outlet of the cleaned air.



Text: Allan Dahl
 Photos: PBJ Miljø and Knud Mortensen

start growing on the surfaces of the Leca LWA.

The appetite of the bacteria is in principle the key contributor to purifying odour. The Leca LWA provides a large surface for the bacteria to grow and provides a series of networks of air-filled corridors.

Pleased with the solution

Pernille Knudsen, Civil Engineer with PBJ Miljø ApS and Project Manager during the planning of the plant, is pleased with Leca LWA as a solution in the filter:

– Before we knew of Leca LWA we used bark in this type of filter. However, bark densifies when mixed with water and retains moisture with difficulty. The Leca LWA filters do not collapse and they retain water well. Thus, the filter requires less water to provide optimum conditions for the bacteria. This, together with the recirculation, means annual water savings of approximately 60 %, she explains.

As the lightweight aggregate is inactive and durable, Pernille Knudsen does not anticipate a replacement of the material for the next 8 - 10 years.

The annual production of the plant in Bogense is 10 million m³ of upgraded biogas, which is sold through Nature Energy under the name BioGas. This provides heat consumption to 6.000 home-units.

Leca facts

Project Odour treatment at Nature Energy Nordfyn

Client Nature Energy Nordfyn

Specifier PBJ Miljø APS

Contractor PBJ Miljø APS

Leca products Leca 10-20



In narrow environments, such as city centres, the cassette solution can be lowered down under ground.

STORM WATER FILTRATION AND PHOSPHORUS REMOVAL IN ÖREBRO

SWEDEN A complete Filtralite solution developed in Sweden to retain and treat storm water.

Text and photos:
Michael Karathanasis

As knowledge about storm water and its pollution increases, higher demands are made for more efficient treatment of, amongst other things: oil, phosphorus and heavy metals. At the same time, heavy rainfall and more extreme weather increases the need for water retention. This is especially true in fast growing urban areas where soil is being replaced by impervious areas.

A combined solution for managing water quality and volume

By combining two proven methods Leca International has, in collaboration with the Swedish consultant firm WEREC Water Ecosystem Recovery, developed a solution that provides effective removal of contaminants whilst providing storage capacity. Investment costs are relatively low by comparison with conventional solutions, as

the operating costs of incorporating Filtralite is both quick and simple.

Depending on the local conditions, the filter can be installed as a filter bed, or by filling pipe modules, at the site of installation.

The filter bed solution is designed for conditions where there is access to park areas or unpaved surfaces, adjacent to the impervious surfaces, which



The material was quickly blown in using a pneumatic blowing vehicle.

Once installed, you can't see it. Material exchange takes place through the installed manhole covers.

allows for material exchange with an excavator. In more urban environments, the filling pipe module solution can be lowered under-ground and material exchange takes place through the installed manhole covers using a vacuum truck.

Installation in Örebro

In the Örebro municipality of Sweden, a storm water filter, based on the filling

pipe module concept, was installed in 2017 by WEREC. The primary purpose of the installation was to separate oil pollution and phosphorus.

After a pre-filter, which separates oils/fats, the main filter was filled with Filtralite Nature P. This is a lightweight expanded clay aggregate that, in addition to particle removal, also binds phosphorus. Dimensioned flow rate is 10 litres per second and the estimated

life of Filtralite is around 10 years. When the 10 years has expired – you simply replace the filter media.

Leca facts

Location Örebro, Sweden

End user Örebro Municipality

Environmental consultant WEREC (Water Ecosystem Recovery)

Leca Product Filtralite Nature P

UNITED KINGDOM

Regus House, Herons Way
Chester Business Park
Chester, CH4 9QR

FINLAND

Strömberginkuja 2
00380 Helsinki

SWEDEN

Gärstadsvägen 11
582 75 Linköping

ESTONIA

Peterburi tee 75
Tallinn 11415

NORWAY

Brobekkveien 84
Alnabru, 0582 Oslo

LATVIA

Daugavgrīvas iela 83
LV1007 Riga

DENMARK

Randersvej 75
8940 Randers SV

LITHUANIA

Menulio 7
LT04326 Vilnius

GERMANY

Rahdener Str. 1
21769 Lamstedt

POLAND

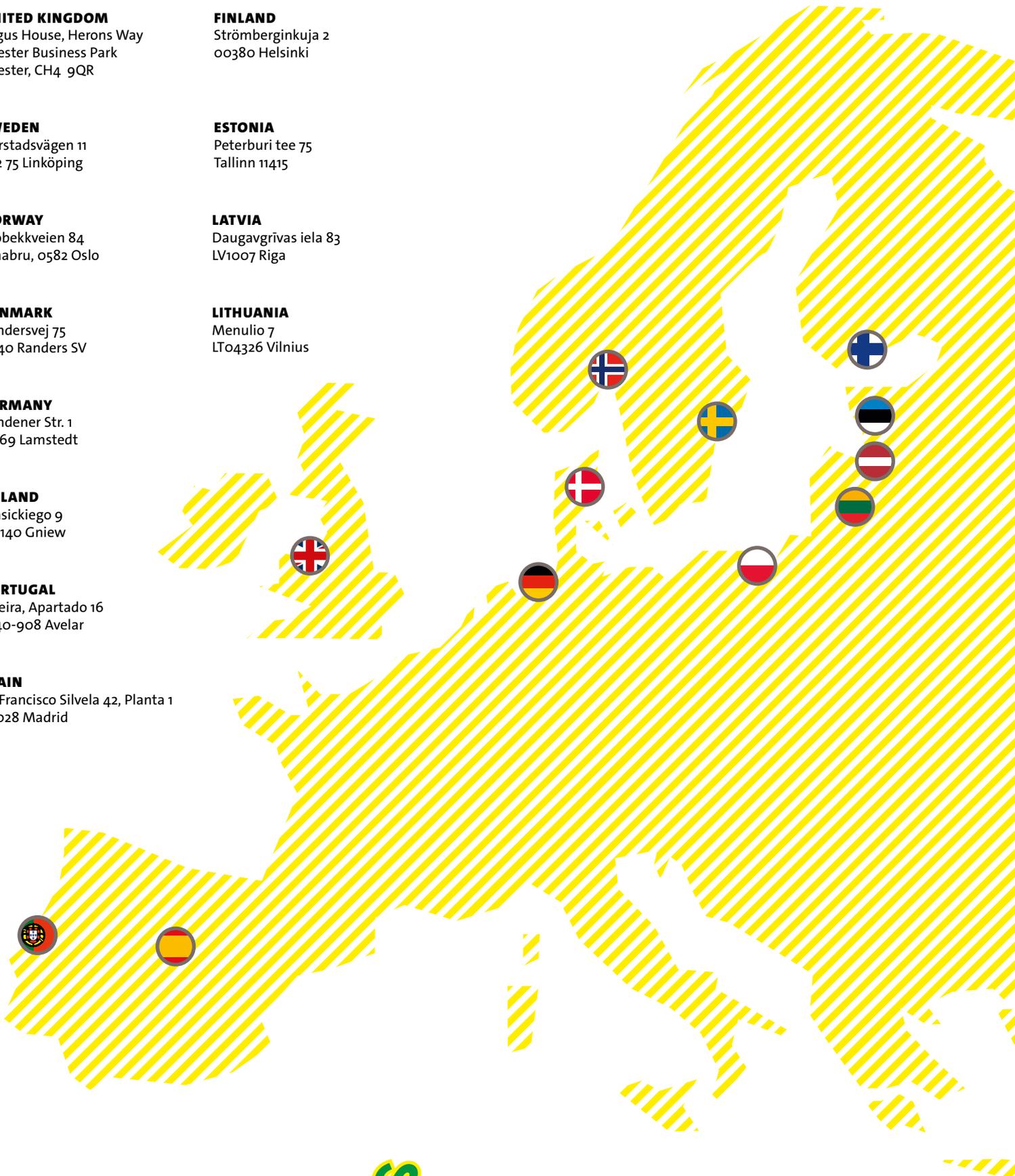
Krasickiego 9
83-140 Gniw

PORTUGAL

Tojeira, Apartado 16
3240-908 Avelar

SPAIN

C/ Francisco Silvela 42, Planta 1
28028 Madrid



Leca[®] A Saint-Gobain brand

Leca International A/S
Robert Jacobsens Vej 62A
2300 Copenhagen S
Denmark