

# BUILD

Leca®

A MAGAZINE FROM LECA

No.1 – 2021

Leca Block house in Finland

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## Up to 164 m<sup>3</sup>

At its maximum capacity, the volume of Leca® light-weight aggregate (LWA) in the new containers of Kuljetusliike Seppälä operating in Finland is up to 164 m<sup>3</sup>. This will help to reduce transport emissions, as a larger amount of LWA can now be delivered to the site at one time. The new containers will also enable even greater delivery capacity for the customers.



## 12

Webinars for 2021 Geotechnical Series – We have lined up 12 new episodes for our Geotechnical CPD Webinar series. Each month will focus on a key area of structural engineering. Episodes in the series include Bridge Development, Rail Engineering, Quayside Development and much more.



## About 1.6 million €

Significant cost savings were achieved using the Leca® lightweight fill at the Kerava–Lahti railroad, which was completed in 2006. Using this solution, the cost savings were approximately EUR 1.6 million when compared to piling foundations. According to the Finnish Transport Infrastructure Agency’s monitoring, the line has operated as expected during its 10 years of operation.

### LECA PORTUGAL TAKES A DECISIVE STEP TOWARDS SUSTAINABLE MANUFACTURING

Leca Portugal SA is investing in a solar park to produce electricity for self-consumption at its Avelar factory in Leiria. The project, which aims to reduce their expanded clay factory’s electricity consumption from the grid, as well as its carbon footprint, is predicted to start operation in August this year.

A total of 2222 photovoltaic modules will be installed in around 1 ha of the factory’s own grounds. Simulations indicate that the park could potentially produce 1579 MWh of electricity per year, covering 25% of the production line’s annual needs. Any excess energy, estimated to be around 3.5% of all produced, will be fed back into the grid.

Apart from reducing the losses incurred during electricity transportation and taking pressure off the grid, a benefit for the entire region, this project enables the company to optimise its production lines and helps it reduce greenhouse gases, as it will generate 100% recyclable energy. The company estimates that the reduction in CO2 emissions could reach 1105 tonnes per year. A goal that fits with the commitment made by Saint-Gobain, Leca’s parent company, to reduce CO2 emissions by 20% by 2025 and reach carbon neutrality by 2050.

The company has invested a total of 600 thousand euros in the solar park. Leca Portugal SA is also joined by Reenergy and Bluemint, who are also collaborating on this project with execution and financing, respectively.



### GOOD EXPERIENCE WITH FILTRALITE® AIR FILTER SOLUTION

An odor removal system was built for the Gasum Oy’s biogas plant in Finland, together with OdorOff Oy, a partner of Leca Finland, using Filtralite Air filter material. The solution successfully removed 75% of odors. The filter solution removed 100% of the harmful hydrogen sulfide. The light, porous and highly air-permeable Filtralite Air filter material is the optimal growth medium for biofilm, which has a long lifetime in effectively removing harmful odors from industry, agriculture and wastewater treatment plants. Used filter material can be taken back to Leca Finland, where the material can be recycled for reuse.



### THE WORLD OLDEST LECA PLANT CELEBRATES 70-YEAR ANNIVERSARY

Oy Renlund Ab established a Leca® lightweight aggregate (LWA) plant in Kuusankoski, Finland, 70 years ago. This was the second plant in the world and the world’s oldest Leca LWA plant still in operation today. With a license purchased from Denmark with the Leca brand, the production of Leca LWA from local clay began in Kuusankoski as early as 1951. At present, the plant has a third kiln in use, which has also been renovated many times. Experience and intrinsic technical know-how of Leca LWA enabled further development of the world’s oldest Leca LWA plant. Sustainability issues, especially with regard to reducing carbon dioxide emissions and understanding Leca’s place in the circular economy, are presently the most important ongoing development targets at the Leca plant in Kuusankoski. Leca Finland is celebrating its 70th anniversary, taking into account the restrictions imposed by the current pandemic.



### COLLABORATION WITH INSTITUTE OF CIVIL ENGINEERING

We collaborated with the ICE Wales Cymru for a new online Groundwork CPD: Accelerating Reparation Time for Settlement Defects. During this CPD, LECA UK highlighted why groundwork engineers specify lightweight fill as a solution to repair settlement defects and to improve road structure stability. This CPD was attended by over 100 influential geotechnical engineers and was focused on a key geotechnical case study involving the N18 Bunratty Bypass in County Clare in Ireland, which was originally constructed over soft subsoils.



Text: Dakota Lavento



Ideapark Seinäjoki is one of Finland's largest shopping centres.

# MANAGING EXTENSIVE TRAFFIC ON LOW-BEARING SOIL

**FINLAND** Leca® lightweight aggregate (LWA) was used as a light fill material in a busy shopping centre in Ostrobothnia.

Covering almost seven hectares, Ideapark, which was opened in November 2019, is one of Finland's largest shopping centres. It also has two thousand parking spaces. Several challenges were encountered when building the 120,000 m<sup>2</sup> facility, since conditions on the site were particularly challenging due to the soft ground conditions.

Fortunately, Jarno Tuominen, Construction Manager at Lehto Tilat Oy, has a wealth of experience from similar projects. "Lightweight fill was needed due to the poor load bearing capacity of the subsoil," says Tuominen. "We opted for Leca LWA, having used it as lightweight fill material for the structurally challenging area of Retail Park Bredis in Espoo in 2017. The

project was a great success and the structure turned out to be excellent. In addition, the product's price was competitive when compared to alternative solutions."

Construction began on the construction site of Seinäjoki Ideapark in the early summer of 2018. Lightweight fill for the large development was delivered over periods

of the summer and autumn of 2018. Around 30,000m<sup>3</sup> of Leca LWA was specified for an area of around 25,000 m<sup>2</sup> which required a lightweight fill material.

## Smooth deliveries

Large quantities of Leca LWA were required on site, and the material was delivered directly to the structures. Marko Jelonen, Area Sales Manager of Leca INFRA Solutions (Leca Finland Oy), visited the site in advance to provide support and to ensure that the project was running smoothly. "Marko and the Leca Finland team, provided key information, technical guidance and technical support for this ambitious project. The contractor also regarded the Leca service as exceptionally good," Tuominen says. A local contractor from Seinäjoki, Maarakennusliike Mäki-Kala Oy, was responsible for the earthworks.

## New compaction method

New solutions, such as compaction methods, were sought and uncovered in order to cope with the challenging conditions. "Compacting the Leca LWA with a vibrating plate was a proving to be highly effective in attaining suitable compaction," Tuominen explains.



The thickness of the Leca lightweight fill layer in the structure of the yard varies between 300 and 1,200 mm.

The thickness of the Leca lightweight fill layer in the structure of the yard in Seinäjoki Ideapark varies between 300 and 1,200 mm. The load-bearing layers and asphalt were laid on top of the lightweight fill layer. Tuominen says that the construction work was unproblematic and completed on time. Both the haulage and development of the structure were a great success. "We have also passed on the earthwork contractor's praise to Marko."

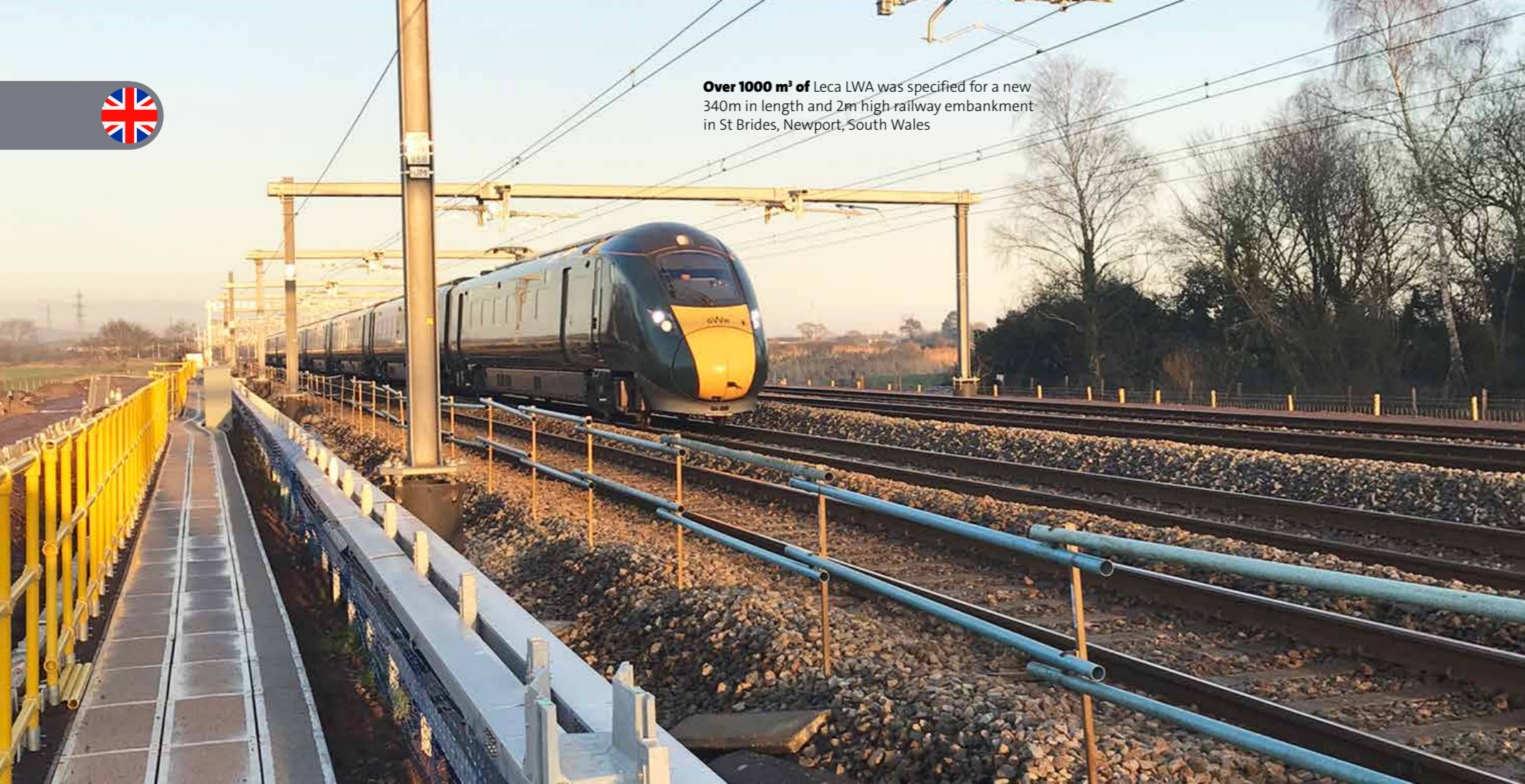
## Project information

- Project:** Seinäjoki Ideapark, lightweight fill for yard areas
- Location:** Seinäjoki, Suomi
- Developer:** Koy Seinäjoen Ideapark
- Turnkey contract:** Lehto Tilat Oy
- Earthwork contract:** Maarakennusliike Mäki-Kala Oy
- Leca® products:** Leca® LWA (4–32 mm)



The shopping centre has two thousand parking spaces.





Over 1000 m<sup>3</sup> of Leca LWA was specified for a new 340m in length and 2m high railway embankment in St Brides, Newport, South Wales



The embankment provided a new and stable walkway

# LECA® LIGHTWEIGHT AGGREGATE (LWA) SPECIFIED FOR RAILWAY EMBANKMENT WALKWAY

**UNITED KINGDOM** Over 1000 m<sup>3</sup> of Leca LWA was specified for a new 340m in length and 2m high railway embankment in St Brides, Newport, South Wales.

The new embankment walkway in St Brides, Newport, South Wales was surrounded by agricultural land and interspersed with drainage reens. This embankment carries up to four lines and a signal gantry spanning all four lines. The aim of the embankment was to provide a new and stable walkway for the platform.

### Specific solutions required for development

Furthermore, a culvert runs through the embankment including two historical overbridge abutments. Whilst specifying a suitable fill material for the earthworks, the material required key properties including lightweight in nature, free draining and contained

a suitable compaction rate, which was in compliance with Network Rail's specific specification.

Similar solutions were considered for this project, Paul Hartland, who was the Agent for this project at BAM Nuttall confirmed that "similar products that complied with the specification

were considered", but Leca LWA offered a solution which offered the "specified fill requirement due to a low load bearing capacity and ease of installation."

### Delivering with a Walking Floor Method

The Leca LWA (10-20mm) was delivered loose by Walking Floor trailers at a delivery siding to the station compound in Newport, this was at a rate of around 70 m<sup>3</sup> per Walking Floor delivery, the material was then taken from the station compound and delivered into place by an excavator. A geotextile backing was used to accommodate the Leca LWA and provide the suitable rate of stability for the important rail embankment.

### Successful Delivery and Specification

The specification of the Leca LWA from the design to delivery was proved to be successful. Paul Hartland, who was the Agent for this project at BAM Nuttall, stated that the "product, service and commercial el-



The Leca LWA (10-20mm) was delivered loose by Walking Floor trailers

### Project information

- Project:** St Brides Rail Platform
- Location:** Newport, South Wales
- Developer:** Network Rail
- Project Agent:** Bam Nuttall
- Leca® product:** Leca® LWA (10-20mm)

ements of the supply was excellent", where the technical support provided by the LECA UK team was "extremely helpful".





Spreading and compaction process.

# LECA® LIGHTWEIGHT AGGREGATE (LWA) OFFERS A SOLUTION FOR ROAD ON SOFT SOILS

**SPAIN** A common problem on highways is the existence of soft soils that can produce significant settlements. This problem was solved with Leca Lightweight Aggregate (LWA). In this project, the designers faced the challenge of avoiding settlements of up to 80 cm by reducing the loads on the soft soils on which the project was located.

This road is located in the western sector of the territory of Granada, specifically through the municipalities of Pinos Puente, Atarfe, Fuente Vaqueros, Santa Fe and Granada. This new highway will enter Granada with various links that will connect different highways such as N-432, GR-NO-14, A92 and A44. This road has two 7-meter-wide carriageways and contains a 1.5-meter wide hard shoulder.

One of the connecting branches longitudinally crosses a large section irrigation canal built on very soft soil. These types of channels are very sensitive to changes in the slopes that allow the free circulation of water. Placing a high load on this structure will produce settlement that will cause the geometry to change and the channel to break, generating serious leaks that will cause structural problems on the road.

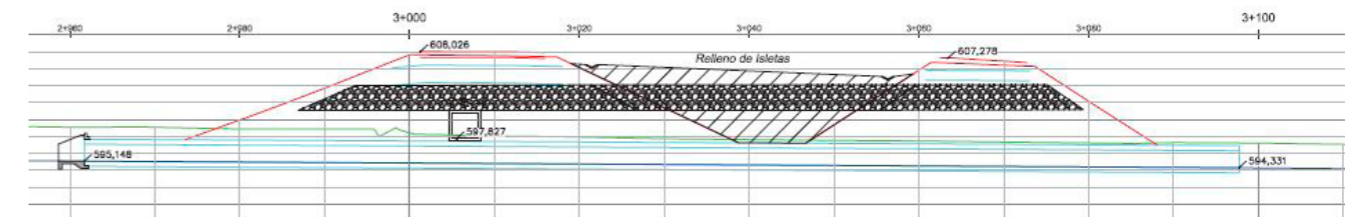
Leca LWA represented a change in the development of the project, being able to completely reduce all the loads caused by the problematic settlement of the soft ground. More than five meters of thickness of Leca LWA were installed to tackle the loads transmitted to the ground.

The 4,000 m<sup>3</sup> landfill was completed in less than two months, allowing the project to be completed on time. The Leca LWA fill was encapsulated in polypropylene geotextile with a grammage of 200 gr/m<sup>2</sup>, installing 1 m layers and compacted with crawler equipment. Subsequently, load plate tests were carried out with values of  $E_{v1} = 42.5$ ,  $E_{v2} = 102.8$ , giving values of the ratio of modules  $E_{v2}/E_{v1} = 2.4$  ( $E_{v1}$  &  $E_{v2}$  are compressibility module in the first and in the second cycle). The landfill was installed with drainage tubes that, if water entered the interior of the landfill, would allow its exit avoiding any type of problem in the future.

Leca LWA was key in the correct design of the solution to the problem of soft soils so that in the future there would not be problems on the road and the solution would offer a suitable economic investment and save on time resources for the developers.



LWA fill before being compacted.



Building cross section of LWA light fill under highway.



### Project information

**Construction Client:** Ministry of Public Works of Spain  
**Contractor:** UTE Pinos-Puente  
**Leca® product:** Leca® 10/20  
**Volume:** 4.000 m<sup>3</sup>

**Simple execution** with earthmoving machines.





On top of the finalized Leca solution crushed stone was placed before installing the new railway tracks.

# 100-YEAR-OLD RAILWAY EXPANDED WITH THE HELP OF LECA<sup>®</sup> CONCRETE

**SWEDEN** Both time and money were in focus when Tyréns suggested to install LLP for a part of Roslagsbanan. An innovative special solution with Leca Lightweight Aggregate (LWA).

Roslagsbanan, which is a railway that is over 100 years old, has for a long time been under refurbishment and expanded with double tracks in order to increase its capacity. It is in fact the last remaining narrow-gauge railway in Sweden for regular trains. It starts from Stockholm's eastern station and then divides into three lines (towards Kårsta, Österskär and Näsbyark). In one day, the route handles about

53,000 passengers. The entire project, which began in 2010, is expected to be completed in 2021.

### Area with loose muddy clay

For the development of Roslagsbanan called Lindholmen, the engineering consultant company Tyréns were assigned the task by SL (Stockholm Public local traffic) to design a railway embankment that ran over difficult

ground conditions, which was muddy and included high water levels. Lena Mören was responsible for the geotechnical project and also the one who designed the solution with Leca LWA concrete.

"It was a section with a low embankment with various solid (2-4 m) peat above loose muddy clay. The railway profile was not allowed to be raised and the ground area was limited. That

is, we were not allowed to take more land for the reinforcement work," says Lena Mören.

### Time and money was the determining factor

Several alternative solutions were considered. Pile deck was an option that was discussed, but was not chosen due to excessive associated costs. "We therefore thought primarily of KC pillars with a combination of mass stabilization. But due to a lack of time in the work phase, there were only a certain number of months to carry out the reinforcement work, and because of a limited space which was close to both the lake and a walking and cycling path, this alternative was also rejected," says Lena Mören.

The chosen solution was instead a so-called LLP which is a reinforced light-weight aggregate concrete slab.

"LLP seemed to be a cost-effective and also time-efficient solution to achieve both bearing capacity and stability on the route without having to raise the profile of the railway," says Lena Mören.



Geotextile was placed at the bottom of the solution.

Installation, that took place during the fall of 2020, was achieved by combining Leca LWA and cement mixture (also called slurry) by using a specially developed nozzle. The mass with the two combined materials is laid out and packed in layers with welded mesh reinforcement.

LLP is not the most common solution when using Leca LWA, but can be

considered as something of a unique solution that is required in fairly specific situations. Lena Mören believes that it is very possible that she may use this solution for future designs.

"In my mind this is a very suitable solution for sections of peat where the embankment is relatively low."

### Project information

**Project:** Roslagsbanan, phase Lindholmen  
**Client:** SL  
**Geotechnical consultant:** Tyréns AB  
**Contractor:** Rosenqvist Entreprenad AB  
**Leca<sup>®</sup> product:** Leca<sup>®</sup> LWA Concrete (Leca Infra 10/20 and concrete)



LLP is an innovative solution achieved by combining Leca LWA and cement mixture by using a specially developed nozzle.





# A NEW HOUSING DEVELOPMENT WITH HIGH EMBANKMENTS AND DEEP FILLINGS

**POLAND** Leca® lightweight aggregate (LWA) allowed for the safe implementation of the architect's bold vision, offering a durable and solid filling without overloading the structure.

New housing investments in dense urban areas are a real challenge for designers and developers. An entrepreneurial developer whose main goal is to implement a profitable construction investment often strives to build the maximum number of residential flats on the plot. And that is the task that goes to the designer who must meet the investor's expectations, in accordance with the applicable provisions of the construction law. The design provisions define, the minimum size of the biologically active surface and the number of parking spaces, which has a decisive impact on the development possibilities. Therefore, an often used design solution is the development of multi-family buildings on three or four sides surrounding the space that creates a courtyard. This design allows for the development of underground car parking spaces over which green roofs are made, providing a biologically active surface and a recreational area for residents.

**Almost a typical implementation**  
An example of this type of development can be highlighted with the new multi-family buildings in Warsaw. In this case, the garage roof reached the first floor of the surrounding buildings. Scarps, retaining walls and stairs

were created to match the existing terrain with attention to functionality and aesthetics. Issues faced for this development included the height of the scarps and the 3.5m depth of the space requiring filling. Therefore, it was crucial to develop a suitable install method and to select the most appropriate fill material.

**Selecting an effective solution**  
The essential criteria for selecting a solution included the lowest possible weight and pressure on the retaining walls; durability over time; resistance to difficult weather conditions, and stability of the structure. After analyzing



Scarps made of expanded clay "mattresses"

ing the materials and solutions, Leca LWA 10-20 mm was selected, which in addition to the necessary requirements offers an excellent filling solution for various permeable and green surfaces, because it has a unique ability to store water, and at the same time effectively drains excess water.

**Another method of compaction**  
Usually, the total thickness of the expanded clay layer is several dozen centimetres; it is then compacted using light plate compactors, in layers of about 30 cm. This time it was different; the target thickness was to be several metres, so in consultation



Functional green space on top of the garage roofs

with Leca's technical department, a slightly different solution was proposed. Leca LWA was laid in layers of about 60 cm, which were levelled and covered with a separation geotextile and about five centimetres of sand, and only then was the whole structure compacted. An efficient plate compactor with a working weight of 400 kg was used for compaction. The use of such a method facilitated and accelerated the compaction of several meters of expanded clay, only slightly increasing the total weight of the filling, while maintaining all its technical and functional values.

**High embankment**  
A similar method was used for the construction of the embankment scarps, with the only difference being that the subsequent layers of 10-20 mm Leca LWA laid on the scarps were wrapped in a durable geotextile, creating a system of "mattresses" placed on top of each other. The high angle

of internal friction of expanded clay, its low weight and drainage capacity, combined with the reinforcement with a geotextile, providing stability to the embankment and creating minimal pressure on the structure of the facility.

**Project information**

**Object:** Complex of multi-family residential buildings

**Location:** Warsaw

**Green Roof Contractor:** MS Bud

**Aggregate:** Leca® LWA 8/10-20 R

**Quantity:** 1480 m<sup>3</sup>



Filling adjacent to the building and retaining walls





Text: Dakota Lavento  
Photos: Olli Urpela and Dakota Lavento

The shape of the roof gives the outbuilding an oriental look.

# STUNNING ARCHITECTURE IN A LECA® BLOCK HOUSE

**FINLAND** This unique house, situated in Helsinki region, is an excellent example of how Leca blocks can be used to create stunning modern architecture.

This architecturally modern Leca block house, which was completed in late spring in Kirkkonummi, blends beautifully into its surroundings. Even though there are as many as 224 gross square metres in the building, it does not seem massive at all. The large structures are lightened by the extensive glass surfaces, and the sculptural roof seems to levitate over everything.

The happy owner of the house, Marko Hietasalo, says that the general plan required that a 1.5-storey building

be built on the plot. That is just the kind of building House Luomaranta is, even though it may not look like it at first. "There are only half as many square metres upstairs as there are downstairs," assures Hietasalo.

When building a traditional 1.5-storey pitched-roof house had been ruled out, architect (SAFA) Sakari Heikkilä was commissioned to design a unique and memorable modern stone house that would suit the plot and meet the family's needs.

## Leca blocks a natural choice

Marko Hietasalo is an entrepreneur and one of the founders of Espoon Talokolmio Oy, which is involved in housing projects of various sizes in the Helsinki metropolitan area both as a builder and developer. In recent years, the company has focused particularly on detached stone houses.

"That's why it felt natural to start building a home for my own family with the same concept we use for building high-quality homes for our customers."



Natural light floods into the combined living room and kitchen from three directions.

## Unique floor plan

Marko Hietasalo was fully responsible for the construction of his house, and had a big role in its design.

The ground floor was designed for the teenage children of the family of five. In addition to the sauna and utility room, a private studio, i.e. bedroom and bathroom with a private entrance, was designed for each youngster.

In addition to the parents' bedroom, a combined living room/kitchen and

a building-wide terrace are located upstairs.

## Sunny, quiet and energy-efficient

The large window surfaces maximise the amount of natural light flooding into the house. The Leca block house is quiet, even though this does not make much of a difference in the peace and quiet of nature. Since the interior walls are also made of blocks, everybody in the family gets along even when not everybody has the same daily rhythm.

## Quickly and effectively

Construction of the house began with earth construction in early October 2018, and the family was able to move into their new home in May 2019.

According to Hietasalo, the entire construction project went very well. Each part of the project was successful, and even though the schedule was tight, it was kept. Professionals know what they are doing.



## Project information

**Site:** Detached house 224 g-m<sup>2</sup>+ outbuilding 20 m<sup>2</sup> from Leca blocks

**Location:** Kirkkonummi, Finland

**Developer:** Marko Hietasalo

**Architect:** Sakari Heikkinen/Arkkitehtitoimisto Sakari Heikkinen

**Leca products:** Leca® sandwich blocks, Leca® basic blocks

The extensive terrace accommodates even a larger group when dining and spending time outdoors.





# LECA® BLOCKS PROVIDES A REDUCTION IN COSTS FOR A SCHOOL CAMPUS

**GIBRALTAR** Isoargila® blocks, with Leca® lightweight aggregate (LWA), produced by Portuguese company Arbel, was the chosen material for constructing two buildings at Westside and Bayside schools in Gibraltar. The technical performance and cost reduction were the two main criteria for its selection.

In Gibraltar's Queensway district, the Westside and Bayside schools complex comprises of two large rounded buildings with a spacious central patio, which is also home to a library. GCArchitects designed the project to minimise the school's carbon footprint, which hosts over 2800 pupils and 200 teachers.

Insulation is a key factor in energy efficiency and, consequently, in the buildings' environmental impact. The designer and the construction company were seeking solutions that would enable them to create a high technical performance structure.

This scenario was suitable for the use of Arbel's honeycomb-structured Isoargila® blocks with Leca LWA for building the walls.

"The material had not been specified in the project but was proposed to Grupo Cascais, the company in charge of the construction in question. Once they had analysed the materials and its benefits, they then presented the idea to the designers as a technically sound alternative, with excellent technical performance in terms of sound, thermal and fire protection, and ultimately, a more economical building solution," outlines Nuno Res-

ende, the engineer in charge of Arbel's technical office.

### Improved performance at lower costs

A total of 430 thousand assorted Isoargila® blocks were used to construct the two buildings that make up the Westside and Bayside school complex. "Choosing this option meant we could substitute simple wall partitions and double-panelled walls with acoustic insulation, with one simple Isoargila® wall, without the need for any other insulation material," explains Nuno Resende. A solution that improved the thermal and acoustic



The Westside and Bayside school complex were among the finalists in the planning, design and construction category of the 2020 Gibraltar Sustainability Award.

performance of the walls and significantly reduced construction costs.

### A commitment to sustainable construction

The Westside and Bayside school complex were among the finalists in the planning, design and construction category of the 2020 Gibraltar Sustainability Awards. The schools' environmental impact was a prime concern, right from the project phase. The buildings have large skylights that maximise the natural light inside and external blinds that control the amount of direct sunlight they receive. Several terraces and a green roof harvest rainwater, which is then used to water the gardens. Photovoltaic panels were installed, which produce clean energy that is used to illuminate the complex.

The school also fosters a culture of respect for the environment among its pupils and teachers. It encourages them to ride a bike or walk to school and recycle waste or use reusable bottles to fill at various drinking fountains around the complex.

**One block, numerous benefits**

Apart from their excellent thermo-acoustic performance and fire resistance, Isoargila® blocks offer several other advantages:

- Highly cost-effective
- Mechanically strong
- Standard altimetry and planimetry
- Low mortar consumption
- Reduced thickness

**Project information**

**Construction project:** Westside and Bayside school projects

**Promotor:** Government of Gibraltar

**Project manager:** Carduus

**Building contractor:** Grupo Casais

**Architect:** GCArchitects

**Arbel products used:** Isoargila® 15, Isoargila® 20 e Isoargila® 25

**Quantity used:** approximately 430 thousand blocks



The designer and the construction company were seeking solutions that would enable them to create a high technical performance structure.



A total of 430 thousand assorted Isoargila® blocks were used to construct the two buildings.



INTERVIEW

# Reducing Emissions is the future for Agriculture Across Europe



**Due to the latest challenging legislation across Europe in relation to the required reduction in emissions, it is now common for farmers and for those working within the Agricultural sector to tackle and effectively manage the issue of harmful gas emissions generated for the surrounding regions.**

In recent years the industry has seen the increase in demands for effective solutions which will significantly reduce the emission of harmful gases such as ammonia, Hydrogen Sulphide (H<sub>2</sub>S) and methane emissions. The challenge for many in the agricultural sector is to incorporate a solution within their farming practices, which is not only effective in reducing emissions to the specific levels set by EU law but also cost effective and does not pose any significant disturbances to their day to day operations.

## History of AEG Ltd

AEG Ltd are an organisation with close connections and experience within the agricultural sector who have seen first-hand, the increase in demand and urgency to find a solution to tackle harmful gas emissions. Darragh Magee (Managing Director at AEG Ltd) explains how AEG Ltd have become a synonymous organisation for uncovering solutions for farmland owners to tackle harmful gas emissions on a huge scale, “AEG was incorporated in 2015, specialising in slurry and digestate storage and management. The individuals in the team have over 30 years’ experience within the sector and have partnered LECA since 2010.” He goes on to explain that “when we started looking at this market the objective was to control odour from agricultural slurry and digestate from AD plants for mainly social reasons, such as reducing odours for the local community.”

To emphasise the emerging changes within legislation with the agricultural sector, he explains, “today everybody is aware of the necessity to reduce emissions from livestock production with particular attention being paid to the pig and dairy sectors. In general farmers are being required to increase their slurry storage from 4 to 6 month’ capacity and are being obliged to cover slurry storage tanks and lagoons.”

## Deadlines Facing the Agricultural Sector

The challenge facing the agricultural industry is the long-term solution for reducing gas emissions. Due to the nature of the agricultural sector, it has been found that the most important level of thinking for this issue is to uncover a consistent solution, “In the UK this requirement is currently being spread over a seven-year period starting with the larger pig units who have to cover all slurry stores by February 2021. Larger dairy farmers and middle sized pig farmers will then follow, with smaller units in both sectors needing to cover all slurry by 2025 and the smaller farms by 2027.”

”  
**The internal structure of LECA Aerotop enables it to float to form a cover.**

“The ‘Storing Silage, Slurry and Agricultural Oil (SSAFO) Regulations are being amended in the UK in 2021 to bring digestate and liquid food waste under the same regulations as slurry. The introduction of IPPC permitting across the industry will follow. This will mean that the market demand





**Effective natural** spread of LECA Aerotop

will grow considerably over the next 5 years.”

**The Challenges of Brexit**

The challenges created by Brexit, does not mean that UK farmers can rest on their laurels that the emission of dangerous gases will not impact them, as the ripples felt by the European directives will still be felt in the UK agricultural sector, “Due to Brexit and its move away from the CAP, the UK is implementing the new ‘Agricultural Act’ with its drive being environmental improvement and its main emphasis being “public money for public good”. If British livestock farmers are to survive, they will have to reduce emissions or be forced out of production by having their permits withdrawn.”



**How Does LECA Aerotop Provide an Effective Solution?**

It was discovered in 2015, that LECA LWA could provide an effective solution in eliminating the emission of harmful gases, this was through historic research conducted by LECA Denmark and then tested and applied in the Agricultural market directly. Darragh reflects on this time period, “Following a successful comparative trial comparing pol-

ymmer treated LECA with ‘LECA AeroTop’, the product was introduced to the market in 2015.”

He goes onto explain how LECA Aerotop can scientifically achieve the results and why the solution has been effective, “The internal structure of LECA Aerotop enables it to float to form a cover. This cover reduces the effect of ‘wind whip’ across the surface of the slurry which would otherwise lift the escaping gases into the atmosphere. Its irregular shapes and sizes mean the aggregates form a jigsaw like barrier that prevents gases passing through it. This cover also reduces the effect of ‘wind whip’ across the surface of the slurry which would otherwise lift the escaping gases into the atmosphere.

The iron oxides in the clay mineral structure of the LECA acts as a catalyst for chemisorption of Hydrogen Sulphide (H<sub>2</sub>S), Ammonia and Methane and other organic compounds. To provide a long term solution to reducing emissions, LECA AeroTop is treated with a hydrophobic coating to prevent it absorbing moisture and sinking. Alternative aggregates have been found to start sinking within 3 to 4 months of installation. Furthermore,

the disposal of LECA AeroTop is not a problem as it is a natural and organic material that can be spread to the surrounding land and then ploughed in safely. The fact that the EU and the UK recognise LECA as BAT (Best Available Technique) is a testament to the effectiveness of this excellent solution in reducing emissions.”

**Ease of Delivery Through Pneumatic Delivery**

Furthermore, to the science behind LECA Aerotop, Darragh also believes the ability to pneumatically deliver the material, positions LECA Aerotop as an even greater solution, “It makes installation quick and easy. Providing suitable accessibility can be achieved and furthermore, LECA AeroTop can be blown onto any lagoon irrespective of its shape or size.” He goes onto confirm that, “We have blown LECA onto tanks up to 18m high. It is a great advantage that you can blow LECA AeroTop without having to carry out any preparatory work to the tank, lagoon or surrounding area.”

**Positive Feedback**

The feedback over the last 5 years have been positive from the Agricultural sector who have chosen LECA Aerotop as a key solution, “Our repeat orders from customers who want to install LECA AeroTop onto new tanks or lagoons as they increase their storage capacity speaks for itself. We also find it makes neighbours in local area happy as by controlling emissions you dramatically reduce offensive odours.”

**The Future for the Agricultural Sector**

In thinking about the future, Darragh feel both optimistic but apprehensive too, as he understands the momentum on the significant shift on public and local authority attitudes towards the environment and waste gas emissions, “Agriculture contributes 24% of global greenhouse gases, 65% of which comes from the livestock sector. With all the regulatory pressure being put on European and UK agriculture to reduce emissions in line with the Paris Accord, the industry has no alternative but to comply. In addition, there is the international drive towards green energy to reduce the use of chemical fertilisers.”

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**LECA LWA can provide an effective solution in eliminating the emission of harmful gases.**

“This will inevitably result in greater and more strategic use of slurry and digestate for both arable and grass production. The financial benefit of reducing ammonia loss to the atmosphere is substantial. With 34.5% Ammonium Nitrate costing about £210.00 per tonne (Euro231.00) reducing ammonia loss to atmosphere makes sound financial sense. The environmental, social and economic significance of covering slurry and digestate storage with LECA AeroTop are indisputable.” But Darragh remains hopeful that AEG Ltd in partnership with LECA can provide a way forward in the challenging years ahead for farmers to maintain their livelihoods and the industry.



**Effective** pneumatic delivery





The square now provides a small oasis to the visitors.

# A PARKING AREA TRANSFORMED INTO A GREEN URBAN SPACE

**DENMARK** An outdated parking area has recently been transformed into a new green urban space. Leca® lightweight aggregate (LWA) provides a solution which offers an innovative rainwater management system beneath the surface area.

The focal point of the new Budolfi Square is a new large green space on top of a car park, facilitating 125 parking spaces. At the edge of the new square is a number of buildings with shops, cafés, a restaurant and 31 apartments. The coverage of the area includes 7,200 square meters of buildings and 4,700 square meters of car parking space.

## Rainwater recycling

Budolfi Square is designed with a focus on rainwater management and recycling. A storage tank that collects and stores rainwater is placed under the surface in order to push it onto an innovative irrigation system,

which intelligently feeds water to the square's trees and plants. The tank can hold 135 m<sup>3</sup> of rainwater, which is collected throughout the year, and when it is filled, the remaining rainwater is led into the sewage system. Tom Pedersen, project manager at OKNygaard, says: "The solution saves on resources required for both the environment and the Aalborg Municipality. If it is a hot summer, where trees and plants require more water than the tank holds, it is possible to fill the tank with drinking water, just as you can add fertilizer offering even more optimal plant conditions. We can furthermore, control the system online - for example, determining

how much water the trees and plants should have. And we are also warned if there is, for example, a leakage somewhere in the system," he says.

## Leca LWA instead of stable gravel

OKNygaard's starting point was designing the roof of the parking basement, consisting of a clean concrete surface, as well as a number of drawings and sketches from the architecture design company.

"The architect had already described the materials that were to be used to build the cityscape, but since we have great experience from similar projects, we ended up being involved in the design phase, and together with



**Project information**

**Client:** Aalborg Municipality

**Contractor:** NCC Danmark A/S

**Landscape gardener:** OKNygaard A/S

**Leca® product:** Leca® 10-20

When the Leca LWA was laid out the geotextile was folded over it, so the material was locked on the sloping areas.

the architects we decided which materials were to be used. Here we got to decide, that Leca LWA should be used instead of stable gravel," Tom says. Tom says that all the materials in the construction of the square had been chosen on the basis of their weight and drainage properties. "We chose to use Leca® LWA, as it is a light and drain efficient product. Had we used sand and gravel, it would have sucked and retained water, like a sponge. In addition, the product does not emit as much dirt as sand and gravel, meaning the water storage tank does not require to be cleaned as often," says Tom.

Tom was new to using Leca LWA for a structurally hilly terrain, and he contacted Leca Denmark to ask about the possibilities.

"I had a good chat with the sales director at Leca Denmark, who explained how to use Leca LWA to build elevations and furthermore presented me some references from similar projects. I quickly came to the conclusion that LECA LWA should be the material we used. There was to be no alternative", says Tom.

## Pneumatic delivery

When Leca Denmark presented Tom with the delivery options, it became

an even more attractive proposition to specify the product. "When I found out that the material could be pneumatically delivered, there was another advantage to the product. So we eliminated the cost of extra machines and cranes. The Leca truck came, delivered and drove again. It was a very positive experience, and we could order the material with only a few days notice", Tom says. Almost 3000 m<sup>3</sup> of Leca 10-20 was delivered to the construction site in Aalborg city center. There were originally 4 roads leading into the square, but 3 of them were restricted due to road works, so the pneumatic delivery facility offered a valuable solution to the logistical conditions.

"We started with 2 men to handle the hose, but since we had to pneumatically blow upwards without a border in several places, we had to have another 1-2 men supporting this delivery. We found a good technique, where we blew a layer, folded the geotextile over it, and blew another layer on top of this, so we could lock-in the material," Tom continues. "We compacted the LWA with a small plate vibrator and subsequently we drove a wheel loader over the LWA layer to test whether it could carry the weight. On reflection, there was never any doubts on the suitability of LECA LWA. There had certainly been many challenges along the way, but not with this material," Tom concludes.



The irrigation system exists of 6 km of water hose, laying in the soil in the green areas.





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