

# BUILD



A MAGAZINE FROM LECA®

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# TOGETHER WE BUILD FOR THE FUTURE



We have spent some time figuring out the essence of the Leca brand and have found that “Together we build for the future” is quite a good summation. It contains at least two elements that we find important.

*Together*, because we include you – our partner/customer/allied – in the process. Many day to day challenges are solved in close co-operation between us as producers and you as designers or builders. This kind of co-operation is essential for us to develop further. Together we find the best solutions.

*The future*, because everything changes. Change is fast and it is imperative to participate in what is happening. In building methods, technology, economic aspects and environmental issues – to have mentioned some of the major changes. And those who do not think ahead, will not be a part of the future.

We hope that the magazine you are holding in your hands right now visualizes the Leca approach to modern building.

Our solutions are in line with modern demands, for instance sound and thermal insulation and low maintenance. Leca walls contributed to sound comfort in a Portuguese school and living comfort for people and horses in Polish farm houses.

Regarding environmental demands like water cleaning and energy saving: We present a passive house with Leca blocks, and the best Czech drinking water ever (cleaned with the environmental Leca product, Filtralite).

And regarding fast, efficient and cost saving building methods: Leca aggregates save weight and thereby costs and work in a Polish bridge and a Scottish landmark. It adds flexibility to house building in Finland and climate resistance on the rough west coast of Norway.

And in addition, or maybe a curiosity, Leca products challenges Danish artists in creating exciting sculptures.

We hope you will find the magazine useful and inspiring.

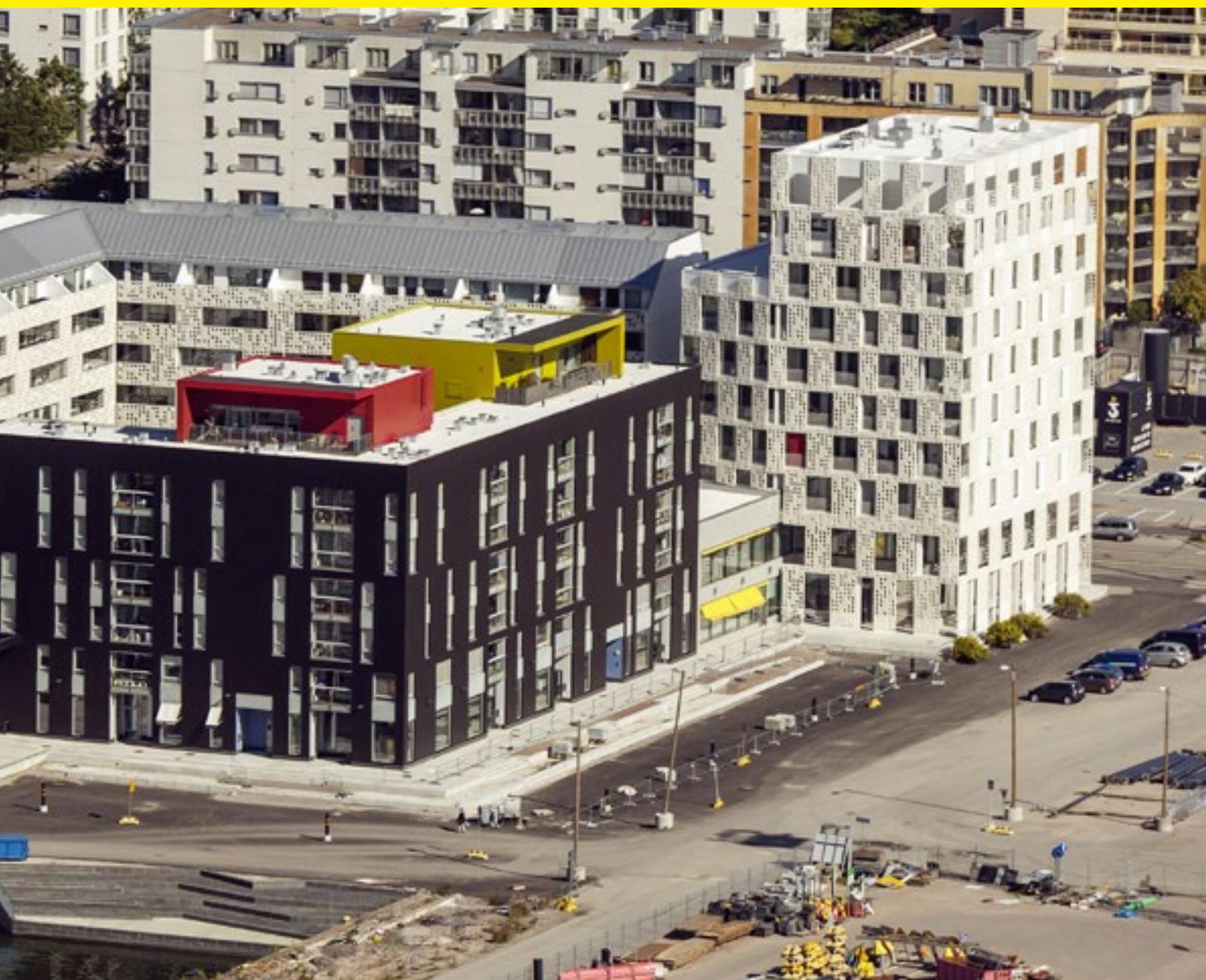
**Torben Dyrberg**  
Managing Director  
Leca International





# THE FASTEST ISOLATED ROOF

**FINLAND** Roofs of Leca® aggregates is the easiest and best solution for isolated roofs on apartment blocks. In the new area Jätkäsaari in Helsinki there are many roofs insulated with Leca® aggregates.





The 220 apartments under construction in Saunalahti in Finland will have a ventilated structural Leca aggregate roof.

Southwest of Espoo the contractor Lujatalo Oy is building two residential blocks with close to 220 apartments. The two blocks are curved and three floors high. The developer is the Housing Foundation and Espoon Asunnot.

The apartment blocks have a hybrid roof for good isolation and technical installation. There is a base of up to 200 mm EPS insulation that is topped with between 800 and 1000 mm Leca aggregate.

“The buildings have a centralized ventilation system and conduits lead from the ceiling down the stairways. The roof has a great deal of technology which is placed within the Leca aggregate layer,” says site foreman Ari Mohell from the contractor Lujatalo Oy.

#### **Filled with tech**

The structural engineer for the project, Taija Karjalainen from Sweco Structural Engineering Oy, says the thickness of the aggregate varies with how much the building services and technical installations require.

“There is practically always technology within low-pitched residential roofs where use of insulation plates is difficult. Managing moisture is always important in construction. The airing through the Leca aggregate and the roof ventilators ensure the proper removal of moisture from the structure,” says Karjalainen.

#### **Common solution**

The ease of application and good thermal insulation has made Leca aggregate a common solution for apartment blocks.

“It is the clearest and least problematic solution. Placing technology in the aggregate is easy and it is also

easy to form inclinations that will lead to roof drains. As a ventilated roof structure, a lightweight aggregate is also operational reliable because moisture can escape,” says worksite manager Heikki Määttänen from the roof constructor Kerabit Oy.

The Leca aggregate is lifted to the roof with a tower crane, and distributing approximately 500 m<sup>2</sup> takes only a few hours. On the same day a concrete layer about four centimetres is spread and honed as a base for waterproofing.



**Competent professionals** quickly cast and knead the thin concrete slab that will become a base for the final waterproofing.

**A filter cloth** is laid on top of the correctly applied height of lightweight aggregate and concrete is pumped up onto the roof from a pump vehicle.

#### Leca facts

**Developer** Asuntosäätiö

**Main contractor** Lujatalo Oy

**Roofing contractor** Kerabit Oy

**Architectural designer** Arkkitechdit  
Hannunkari & Mäkipaja Oy

**Structural engineering** Sweco  
Rakennetekniikka Oy

**Leca products** Leca aggregate KS 420K



**The 30-metre high horse heads** rise above the landscape. To reduce fill weight Leca aggregates were used on the Helix project to secure and maintain the existing fresh water trunk main. (Photo: Martin McCarthy)

#### Leca facts

**Facility** Helix project

**Location** Falkirk, Scotland

**Application** 2000 m<sup>3</sup>

**Contractor** R J McLeod (Contractors) Limited

**Landscape architects and engineers** Ironside Farrar

**Leca products** Leca aggregates

# CREATING A STABLE GROUND

**UK** *Constructing the Helix project directly above Scottish Water Mains pipes created a challenge. Leca® aggregates made it possible without rerouting the mains pipework.*

The Helix project in Falkirk has transformed a tired and lifeless environment into a most expansive and attractive community location. The entire site is linked by 27 kilometres of shared access pathways linking 16 communities, much of which has LED lighting, main access ways and a canal tunnel under the major M9 motorway.

Leca aggregates have played a key role below the surface of this project enabling construction access and land raising directly over a Scottish Water 36" fresh water trunk main and a 500 mm pumped rising main. Its specification has avoided enormous additional costs that would have arisen from the rerouting of Scottish Water's assets.

## **30 metres high**

Rising high above this futuristic community landscape are The Kelpies, two fabulous 30-metres high, stainless steel sculptures of equine heads reflecting the significant role the heavy horse played in Scotland's successful era of heavy industry and now dominate the skyline illustrating the typically equine quality of strength and power.

This beautiful sculpture has been brought dramatically to life by incredible engineering knowledge and superb construction skills.

The overall landscape architecture for Helix was conceived by landscape architects and engineers Ironside Farrar of Edinburgh.

David McCandless, graduate geo-environmental engineer, explains why Leca aggregates were required: "Putting both the raised hard and soft landscape works associated with the Kelpies over the mains would have placed unacceptable weight on the pipework so we looked for a lightweight product to substitute the traditional earth fill and Leca aggregates fitted the bill. By replacing up to 1250 mm of additional fill with Leca aggregates we reduced the increased load substantially and were able to demonstrate that the land raising could occur without undue risk."

## **Resolved weight problem**

This resolved the weight problem at Helix to the satisfaction of both Ironside Farrar's engineering team and Scottish Water's asset manager.

Civil engineering contractor R J McLeod (Contractors) Limited carried out the excavation and refill project and Spencer Carnie, project manager, supervised the work on site. He says:

"We removed the existing fill to a depth of a metre to expose the top of the water main. Then we back filled and raised the levels with 2000 m<sup>3</sup> of Leca aggregates which was delivered close to the working site allowing us to place it quickly and easily with tracked shovels. Leca aggregates worked very well for us with no problems at all."



# REDUCING COST BY HALF

**POLAND** Using Leca® KERAMZYT in the construction of an access road to a new bridge in Szczecin in Poland, cut cost in half.

The new bridge over the Odra river in Szczecin in Poland was a huge investment. Linking the city with the Gryfia Business Park on the islands Ostrów Brdowski and Gryfia, the bridge was completed last year.

Before the bridge was completed the connection between the islands and the city was by ferry. The ferries had high maintenance costs and a lot of problems, which led to decreased investments in the area.

### Poor soil

The construction was done in two stages. Stage 1 involved building the almost 200-metre long steel bridge across the river. In the second stage an access road and connection with existing roads were constructed.

The poor non-bearing soil structures in the deeper layers of the

ground posed a risk for uneven structure settlements. To avoid the risk it was decided to reduce the tension on the embankment by using expanded clay.

### Double mattress

A mattress was made from Leca KERAMZYT – an aggregate that is four times lighter than the soil at the site. The Leca aggregate was wrapped in geotextile fabric to form a mattress. On top of this mattress a new mattress formed from geonet and crushed aggregate was placed before it was topped with surface structure.

The solution reduced the tension below the road structure considerably. The aggregate was used to reduce tension, while the crushed aggregate evenly distributed the forces from the traffic.

The construction of the bridge was completed by Mars Most Brdowski and was co-funded by the European Union with resources from the regional development fund.

### Leca facts

**Facility** Brdowski Bridge and the road connection to Ostrów and Gryfia islands.

**Location** Szczecin, Poland

**Investor** Mars Most Brdowski

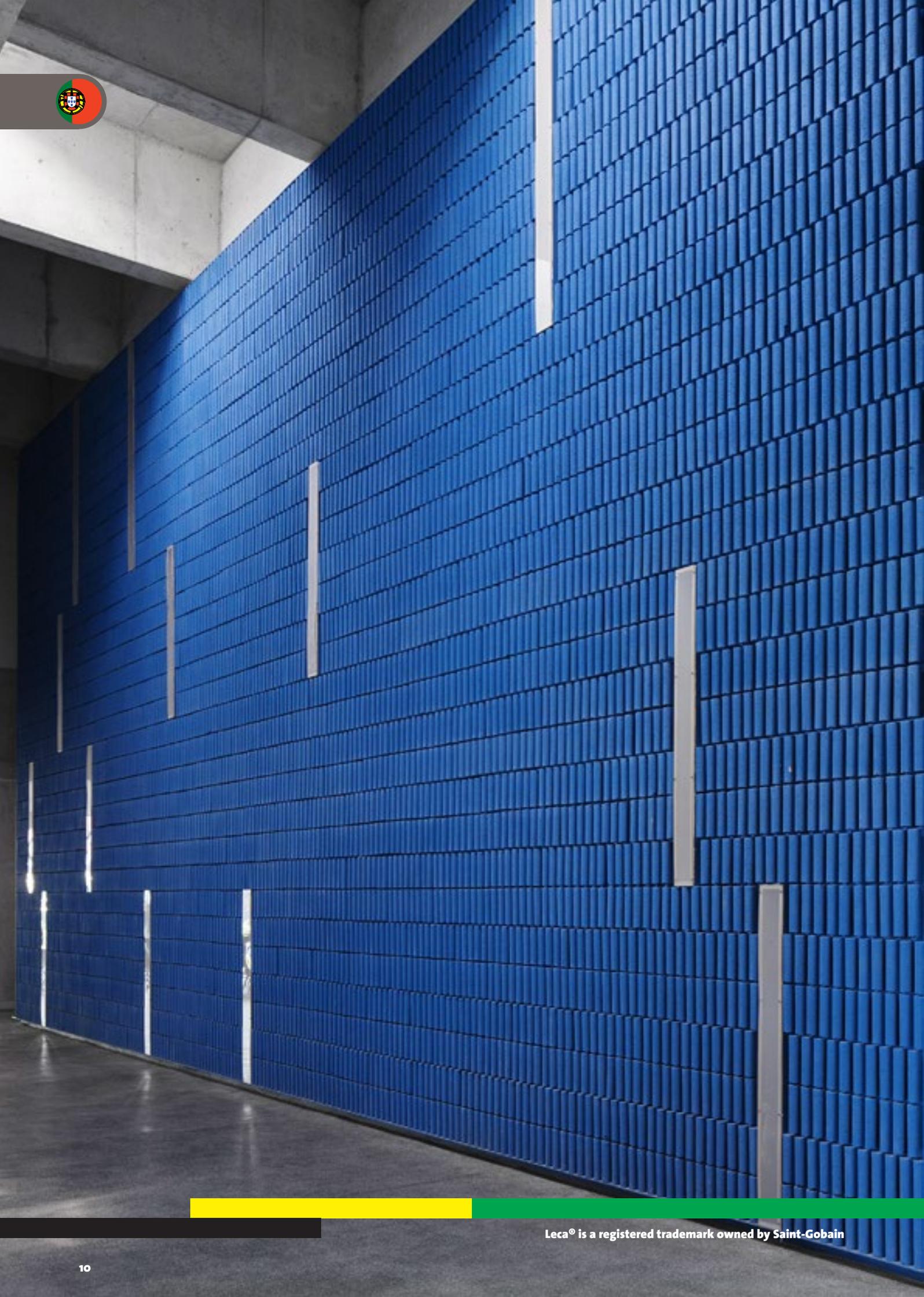
**Contractor** PRO Nowograd

**Leca products** Leca KERAMZYT 8/10–20 R



**The ground was non-loadbearing.** A mattress of geotextile fabric and Leca KERAMZYT was created before a new mattress with crushed aggregate was put on top to distribute pressure from traffic.

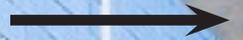
**The Brdowski bridge** created the first road connection to the islands in Szczecin, making the area more attractive to investors.



Leca® is a registered trademark owned by Saint-Gobain

# A BETTER SOUNDSCAPE FOR STUDENTS

**PORTUGAL** *The use of Leca® Soundcomfort blocks in the renovation of a school in Lisbon, created better acoustics and an aesthetic appeal.*





In the hallway in Braacamp Freire School in Lisbon, Portugal, the unique Leca Soundcomfort blocks were used to create better acoustics and an exciting look. The school was both renovated and enlarged during the project.

### Containment

The Leca Soundcomfort blocks were used to contain sound between the hallway and the adjacent auditorium. Soundcomfort blocks became essential because they brought an acoustic comfort and increased acoustic absorption.

According to the architect behind the project, Cristina Verissimo and Diogo Burnay Architects, the blocks were chosen because of their simplicity and robustness. Another

important factor was that the block harmonised with the existing design and interior of the school.

### Tight budget

The project was on a tight budget. The surface of the Soundcomfort blocks meant that the need for renders and facade finishing was eliminated from most of the building. Excluding renders on the surface helped bring the project within a feasible budget.

An aesthetic value was added to the project with the blocks' grooved surface. In some parts of the building the walls were painted in bright colours.

Expanded clay aggregate was also used in the floor fillings of the school.

**Soundcomfort blocks** were used to create better sound and acoustics when renovating Braacamp Freire School in Lisbon, Portugal.

**Bright colours** and the surface of the Soundcomfort blocks harmonised well with the already existing design of the school.

### Leca facts

**Project** Braacamp Freire School

**Location** Lisbon, Portugal

**Architect** Cristina Verissimo and Diogo Burnay Architects

**Leca products** Soundcomfort blocks and Leca aggregate



# SUPPORTING SCOTLAND'S TRAMWAYS

**UK** *To provide access to Scotland's home of Rugby, Murrayfield Stadium, Leca® lightweight aggregates were just the ticket.*





To create a stable and high raised tramway system in Edinburgh, the Murrayfield tram stop was built on Leca lightweight aggregate.

Challenges involving an already existing Network Rail line and buildings made Leca lightweight aggregate the best solution for the new Edinburgh tramway system. The station at the famous Murrayfield Stadium, home of Scottish Rugby, was made possible thanks to the properties of Leca aggregates.

### Overburden

The existing ground level made it challenging to raise the seven-metre high structure. Traditional fill would create an excessive burden on the ground and threaten the stability of the existing Network Rail line.

“One of our main issues was to get such a large earthworks struc-

ture founded on the underlying soft ground conditions without significant ground improvement being undertaken. The lightweight attributes of the Leca aggregates satisfied these criteria, significantly lowering bearing/settlement at formation compared to traditional fills. It also interacted with the Tensar elements of the structure without difficulty,” says Tristan Morgan, geotechnical engineer at Parsons Brinkerhoff.

### 14,000 m<sup>3</sup>

The light weight of Leca aggregates was the perfect match for the challenge.

“Faced with the complications at the Murrayfield site, especially the potential expense of excavating unsuitable ground, Leca aggregates have proved exactly the right choice of material for this technical

project. Access to the platform site was difficult but Leca aggregates are a versatile and easy material to handle,” says Andrew Henry, construction manager at Graham Construction.

More than 14,000 m<sup>3</sup> of Leca aggregates were required for the Murrayfield tram stop. The aggregate was shipped directly to the nearby Port of Leith and trucked to the site with large capacity delivery vehicles.

#### Leca facts

**Facility** Murrayfield tram stop

**Location** Edinburgh, UK

**Application** 14,000 m<sup>3</sup>

**Consulting engineer** Parsons Brinkerhoff

#### Leca products used

Leca lightweight aggregate



**Bearing and stability** concerns made Leca aggregates to be the perfect material for infill when constructing the Murrayfield tram stop in Edinburgh.

**The new Edinburgh tram system** was completed in 2014 and quickly gained an annual number of rides at about 5 million passengers.

*Faced with the complications of the Murrayfield site, Leca aggregates proved to be exactly the right choice of material for this technical project.*





**Leca sandwich block masonry** is progressing rapidly, thanks to an experienced group of masons.

**Five three-floor buildings**, with a total of 140 apartments, will be built from Leca Sandwich blocks in the area.

**In order to ensure** the smooth running of the work, the cleanliness of the worksite and logistics management are essential.

# A COST-EFFECTIVE SOLUTION FOR APARTMENTS

**FINLAND** *Finland's largest apartment block project in Espoo is built with Leca® Sandwich blocks. The 140 apartment project has so far been a success.*

The contractor Basso-Kivitalo is building a 140 apartment complex in Pellaslaakso, Espoo, in Finland. Consisting of five three-floor deck access blocks, the 5400 square metre complex is the biggest in Finland.

"If apartment buyers were asked if they would like a stone masonry building or a precast concrete house, they would consider a stone masonry building to be a much better choice," says development director Jukka Lehtonen of Basso Building Systems Oy.

## **More flexible**

Previous experience with an apartment project in Sipoo taught the construction company that using Leca blocks is no more expensive than using elements. Several of the company's previous apartment projects have shown that Leca blocks are a cost-competitive building material.

"Elements have to be designed completely ready before orders, due to wiring installations. Leca Sandwich blocks are immediately available. And they are much more flexible than elements in terms of their design and implementation," says Lehtonen.

In the construction of apartment blocks the benefits of the flexibility of block construction are even greater than when building single family houses. In big projects it is easier to fit in various work stages to proceed flexibly in different buildings and floors when using blocks.

## **Stronger blocks**

In previous apartment blocks Basso Building Systems Oy has used Leca shuttering blocks in the lowest parts of the construction. Due to stronger Sandwich blocks, that is no longer necessary.

"Thanks to the stronger Leca Sandwich blocks, the construction is even simpler, since all floors are laid down in the same way. In Pellaslaakso, Espoo, shuttering blocks have only been used in a few specific locations. A house built from Leca Sandwich blocks can also be rendered almost at the same time, whilst, with concrete blocks, one must wait longer for the concrete to dry," Lehtonen says.



**Leca facts**

**Facility** Apartment blocks

**Location** Espoo, Finland

**Developer** Nuorisosäätiö

**Main contractor**  
Basso Building Systems Oy

**Architect**  
Arkkitehtitoimisto Antti Heikkilä Oy

**Leca products** Leca Lex Foundation blocks, Leca Design Sandwich Blocks, Leca EasyLex, Leca shuttering blocks, Leca Sandwich shuttering blocks



# INNOVATIVE HIGH FLOORS

**SPAIN** *The circular shape of the Gamesa headquarters was perfect for the innovative floor solution using Leca®.*







Building a circular structure represents a challenge for prefabricated concrete elements. A new and innovative solution was needed to build the new headquarters for Gamesa in Pamplona in Spain.

Using slabs of prestressed Leca in various forms, the floor could be built with the shape the architect imagined.

### **Revolution**

The innovative floor solution was developed by Ariblock Viguetas Navarras together with Viguetas Navarras S.L. and the Centre for Development of Industrial Technology (CDTI) to build floors in high buildings.

Leca prestressed slabs are a revolution in construction. The market

has adopted the floor slabs as a standard solution that is both safe, strong and of high quality.

Gamesa's headquarters are five floors high and 11,000 m<sup>2</sup> in size. The contractor VDR and Gamesa chose to use the Leca prestressed slabs also because they improve the soundproofing, well above the requirements of CTE, between floors. It is also calculated that the high coefficient of thermal insulation will result in a significant energy saving in the building.

### **Quick installation**

As with all Leca products the slabs provide an unbeatable prefabricated fire protection, complying with the REI 180 standard.

Another advantage of using the prestressed Leca slabs is their quick installation. In total 8000 m<sup>2</sup> of slabs were used in the Gamesa building. The speed of installation was 500 m<sup>2</sup> a day, which makes it an attractive product for a wide range of uses.



**The Gamesa headquarters** is a spectacular building in Pamplona.

**An innovative solution** for building floors was used to adapt the floors to the buildings circular shape.

**Using prestressed Leca slabs** in the floor construction gave the contractor a floor that has good insulation, excellent soundproofing and is fire resistant.

**The headquarter have** 8000 m<sup>2</sup> of office space. The use of the prestressed Leca slabs meant that 500 m<sup>2</sup> could be built in a day.

#### Leca facts

**Facility** Gamesa headquarters

**Location** Pamplona, Spain

**Client** Gamesa

**Contractor** Consortium of VDR and VIGUETAS NAVARRAS

**Architect** Antonio and Juan Luis Irigaray Vaillo

**Leca products** Prestressed slabs Leca that used Leca MF



# COOL IN THE SUMMER, WARM IN THE WINTER

**POLAND** *When establishing an agritourism business in Bierzwnik in Poland, Katarzyna chose Leca® blocks because they are natural, save energy and are easy to build with.*

Five years ago Katarzyna decided to build her new agritourism business in Leca blocks. The reason was she wanted something that was easy to maintain.

“I wanted a comfortable house for my guests and my animal friends to be warm in the winter and cool in the summer. That is why I use blocks of expanded clay,” tells Katarzyna.

Her agritourism business is located to the village of Bierzwnik in the West Pomeranian area of Poland. The house was built in 2011 and has a floor area of 600 m<sup>2</sup>. The house and stable constructions are made from light Leca blocks and built across a ground floor.

## Hospitable house

Her guests appreciate the climate inside the house. She says the house is wonderful.

“In the summer the guests ask if the rooms are air conditioned because they are so pleasingly cool. In winter the house is easy to warm up, you can feel the warmth after only 20 minutes,” Katarzyna says.

She knew about expanded clay before she started planning her agritourism business. When she was told it also could be used for blocks, she wanted to use it.

“Two factors influenced my decision. Firstly, expanded clay is a natural material. Secondly, an experiment showed that expanded clay blocks was the first of construction material to dry up after being immersed in water,” she explains.

## Low cost heating

Due to the good insulation characteristics of the blocks, the heating of the house is easy.

“The cost of heating my house with an area of 600 m<sup>2</sup> is comparable to heating a 300 m<sup>2</sup> house,” says Katarzyna.

She says that she will recommend blocks of expanded clay to others.

“The fact that I also build stables for my beloved animals should be a sufficient recommendation,” she remarks.

### Leca facts

**Facility** Agritourism / horses stables

**Location** Bierzwnik, Poland

**Leca products** Leca Blok 24



**The guest house** is built in Leca blocks. In the winter it is warm, and in the summer it is cool and comfortable.

**The horses also** got new stables built in Leca blocks. "I want my animal friends to be warm and dry in the winter and cool in the summer," says Katarzyna, the owner of the agritourism site.

**The fact that** expanded clay is a natural building material was important when Katarzyna chose Leca blocks.





# A DESIGN FOR URBAN LIFE

**DENMARK** *Inspired architecture students have placed Leca® at the cutting edge of urban design by discovering this versatile and surprisingly stylish material.*

These bright young minds have discovered a way to put Leca aggregates at the heart of stylish design in an urban environment, by finding new ways to maximise the benefits of this versatile building material. Leca aggregates are now officially cool – LeCool, in fact.

## **Making Leca LeCool**

Aarhus School of Architecture encouraged its students to experiment with materials and fabrication methods, in order to challenge preconceptions and uncover new possibilities for architects to consider in their designs for buildings and urban spaces.

The students looked to new technologies to transform Leca aggregates into a swooping, curving design, from a small prototype model to a full-sized exhibition piece.

After using 3D modelling software to determine the shape, the students turned their design into reality using robotic hotwire to cut through polystyrene blocks to create a mould. The end result was an extremely creative and exciting Leca sculpture.

The finished design is named LeCool and was exhibited at the Milan Design Week to demonstrate how digital fabrication technologies, such as robotic hotwire cutting and CNC milling, can be used to produce dynamic shapes using Leca aggregates. This is a brave new world for urban design.

## **Endless exciting possibilities**

“It opens up exciting opportunities and new ways to work with shapes – you can form the material into pretty much any shape, so the design

potential is massive,” says Niels Martin Larsen, associate professor at Aarhus School of Architecture.

This creative project opens up a world of possibilities for using Leca aggregates. For example, Leca’s ability to allow water to permeate through it makes it worth considering for an urban roof garden or park setting with raised flower beds in exciting forms.

With such a versatile, durable, and environmentally friendly material, the only limit is the architect’s imagination.

Look out for Leca products appearing in exciting urban design projects all over the world.

**The sculpture *LeCool*** was first made at a small scale and then scaled up to fit the exhibition space.

**Students using robotic cutting** technology created the curved sculpture in foam before it was cast in Leca. The sculpture was exhibited at the Milan Design Week in April.



#### Leca facts

**Facility** Unit F, Aarhus School of Architecture, Denmark

**Developers** Second- and third-year bachelor students Sara Strandby Braae, Niklas Søndermølle Frandsen, Martin Waltersdorff Nielsen, and Mathias Waltersdorff Bugge

**Leca products** Leca aggregates



# A BETTER FACADE

**NORWAY** *The IVAR Langevatn water treatment plant supplies 320,000 people with fresh water. When expanding the plant, Leca® Isoblokk plays an important role.*



The expansion of the water treatment plant is expected to provide sufficient capacity for the population in the area until 2050. Construction work started in 2014, and is expected to be finished in 2018.

“The construction site is at times very busy, and the deadlines are tough. But it is also a very interesting site to be working on,” says Srdjan Mijatovic, foreman for the masons in the company Waldeland & Varhaug AS Murerfirma.

Leca Isoblokk has been used to isolate technical areas from the huge

water basins that will be filtering the water. Between the old plant and the expansion there is also a huge Leca Isoblokk wall.

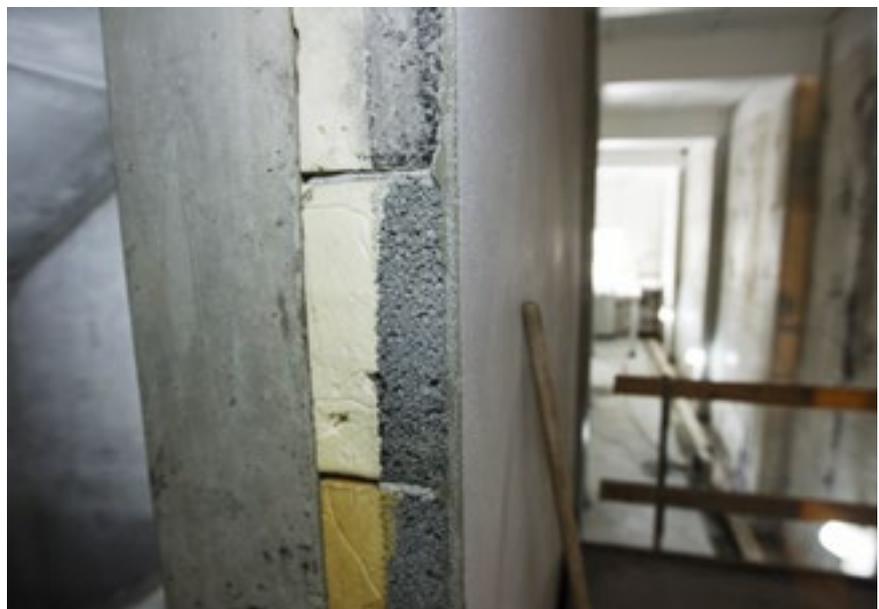
## **Isolation wall**

The new treatment plant has a lot of concrete walls and constructions. In many places the half Sandwich block, Leca Fasadeblokk, is used both to increase the insulation properties of the wall and get a more attractive facade.

“The walls are so high we need to do them in several rounds to pre-

vent them from seeping. As a final treatment, the walls will be plastered with fibre coatings,” says Mijatovic.

The total cost for the expansion of the water treatment plant is estimated at around 120 million euros. That will give the population of the region of Stavanger and Sandnes, the petrol capitol of Norway, a better, cleaner, and clearer water supply over the next several decades.



**The huge water treatment plant** in Ålgård south of Stavanger will be partly isolated by Leca Fasadeblokk.

**The 120-million-euro** expansion of the water treatment plant south of Ålgård will secure 320,000 people with a supply of fresh water for the next several decades.

**Srdjan Mijatovic** (left) of the company Valdeland & Varhaug AS Murerfirma will be working at the construction site on and off for several years.

#### Leca facts

**Facility** IVAR Langevatn water treatment plant

**Location** Ålgård, Norway

**Developer** IVAR recycling and water treatment

**Contractor** Kruse Smith Entreprenør AS

**Masonry work** Valdeland & Varhaug AS Murerfirma

**Leca products** Leca Isoblokk 30, Leca Fasadeblokk

**Weber products** Weber Fibre Coatings, Weber ready-mixed mortar M5



# THE BEST AND MOST AFFORDABLE WATER

**CZECH REPUBLIC** *By replacing traditional sand filters with Filtralite®, the Bedřichov Water Treatment plant in the Czech Republic reduced energy costs by 75 percent, and doubled capacity.*

On top of that, the water treatment plant now delivers the best drinking water they have ever produced.

After a year of scientific pilot testing at a small scale, the decision was made to change from sand to Filtralite. Six months after putting the new water filters into production, regional manager Ladislav Rainiš at Bedřichov Water is impressed.

“We have clearly seen the advantages of Filtralite, and we are now replacing the sand filters in the remaining basins with Filtralite,” he says.

The pilot test confirmed what other water works have reported: energy saved, increased output, and improved water quality. Bedřichov Water supplies about 100,000 people with fresh water in Liberec in the Czech Republic.

## A modern product

Filtralite is a modern product, devel-

oped for water filtering purposes. It works on a slightly different principle to sand filters. Filtralite can be characterized as small hard pieces of open sponge, full of internal pores. As the water passes through the filter, the particles are trapped in the Filtralite pouches.

“The result is more than four times longer filtering intervals, which means that 75 percent less energy is needed when flushing the filter. Filtralite also leads to the plant doubling its output,” says professor Petr Dolejš at Brno University of Technology.

He says that most water works could benefit from the reduced energy costs when using Filtralite.

## Two layers

The Filtralite used in the plant consists of two layers, a so-called “Mono-Multi” solution. The layers are of different size and density. After flushing

the filter, the layers falls back into place and are not mixed together.

“After changing to Filtralite we have seen an improvement in the general performance. The amount of particles leaving the filters have been greatly reduced, and the numbers of particles evading has been improved by a factor of ten,” explains professor Dolejš.

### Leca facts

**Facility** Bedřichov Water Treatment Plant

**Client** The North Bohemian Water Company

**Leca products** Filtralite in different sizes and densities



**“We have clearly seen** the many advantages of Filtralite,” says regional manager Ladislav Rainiš of the North Bohemian Water Company after introducing Filtralite in the Bedřichov Water Treatment Plant.

**The Bedřichov Water Treatment Plant** has reduced energy costs and increased production. On top of this, the plant is delivering its best water ever.



#### Facts



#### Filtralite

- Made of expanded clay
- Can be used for both conventional and biological filtration of effluent and potable water, including desalination
- Available in variable sizes (0.5–20 mm) and densities (320–900 kg/m<sup>3</sup>)
- Longer filter runs between backwashes (up to 800 %) and higher filtration velocity (up to 20 m/h)
- Return on investment in 1–3 years (product lifetime > 25 years)
- Installed in more than 200 water treatments plants in over 40 countries since introduced in 1994



# FIGHTING THE ELEMENTS

**NORWAY** *Almost hanging on the edge of a cliff, the family house in Western Norway needs to withstand a tough climate and wet weather.*

The weather on the west coast of Norway is tough, and demands more from building materials than most places. The closer you get to the salt water, the more the materials must endure.

“The facade of the houses around here are sanded down by the sea, wind, and salt in the air. Choosing a tough and durable material like Leca and a thick coating means we do not have to use as much time on maintenance as the neighbours,” says house owner Ketil Jensen.

The ground floor was cast in concrete. The family of four lived on the ground floor while the first floor was built on top of them in Leca.

“Using Leca was an easy decision. The Sandwich block gives us a wall that is ready insulated. We try to use materials that are easy to wash and maintain. The purpose of the porch is to enjoy the view, not work on the house,” he says.



**Leca facts**

**Facility** Family house

**Location** Askøy, Norway

**Contractor** Private

**Leca products** Leca Isoblokk 35



# EASIER FLOORS WITH LECA®

**FINLAND** *The light weight, fire-resistant properties, and easy usage of Leca® aggregates made them the best choice when replacing the fillings in intermediate floors in a renovation project.*

A complete renovation of an apartment building in Helsinki, Finland, required all structures and technical installations, with the exception of the frames and facades, to be dismantled.

## Sound and fire

The goal of the project was to renovate the apartment building in Helsinki, Finland, from the 1950s up to modern standards when it came to sound, heat, and fire prevention. The building also needed a general upgrade on the building installation.

“A decision was made to replace the old fillings of the intermediate floors with Leca aggregates, both for sound and fire technical reasons. The use of Leca aggregates easily achieves both requirements,” says Valtteri Vaarsalo, chief structural designer from Sweco Asiantuntijapalvelut Oy.

## Easy to apply

The apartment building is five storeys

tall. As an alternative to Leca aggregates hard wool was considered, but the cutting and installation of the wool would be more demanding.

“Leca aggregates were selected as the new floor filler material partly because it is easy to apply by blowing it in place,” says foreman Ari Anttilainen from Fira Oy.

To prevent dust from spreading, the aggregate is sprayed with small amounts of water as it is blown between the inverted beams in the floor. Most of the moisture evaporates in the blowing process or soon afterwards. To make sure the humidity is within acceptable levels, wireless humidity sensors were installed during the process.

“Through a cloud service, the readings from the sensors can also be utilised by the client and the supervisors,” says Anttilainen.

According to Vaarsalo, the measurement data from the humidity sensors have provided safe read-

**The apartment buildings** were dismantled, save for the facade and frames, before they were rebuilt to modern standards.

**“Leca aggregates were selected** partly because they are easy to apply through blowing,” says foreman Ari Anttilainen, of Fira Oy.

**Leca aggregates** were blown directly from ground level when filling the intermediate floors.

ings immediately from the very first measurements.

“The blowing of lightweight Leca aggregates only takes one working day, which is an advantage in regard to the operational schedule of the entire worksite,” says Anttilainen.

## Leca facts

**Location** Helsinki, Finland

**Developer** Mutual Pension Insurance Company Ilmarinen

**Contractor** Fira Oy

**Leca contractor** Anpe Oy

**Structural engineering** Sweco Asiantuntijapalvelut Oy

**Leca products** Leca aggregates 4–20 mm





# QUICK INTERNAL WALLS

**NORWAY** *The students at the Norwegian University of Life Sciences will soon enjoy a new sports centre. The inner walls are made with Leca®.*

The Eika sports centre is an expansion of the old student recreation centre at the GG-hallen, some 30 kilometres south of Oslo in Norway. Opening in November, it gives the 5,000 students a new and better sports centre.

“The new centre partly incorporates and is built around the old sports centre. Because of a very short construction period, we decided to use Leca Lettveggsblokker on almost all the inner walls,” says Marius Aamodt, foreman with Veidekke Entreprenør AS.

## **Quick mounting**

The Leca Lettveggsblokk is especially well suited to the project. Because of progress at the site the inner walls had to be set up before the roof was in place. That meant that the inner walls were exposed to changing weather and had to withstand a lot.

“Because the walls were exposed to the changing weather in Norway, we had to use a material that could withstand a period basically outdoors. The only building material that is not harmed in those conditions is Leca blocks,” says Aamodt.

One special thing about the blocks is that they are not fixed with a cement-based mortar or glue. The installation is done with the special Stone Fix glue, a polyurethane-based foam glue.

“Using the glue we can mount the walls very quickly and with very good results. The glue fixes the blocks in a very short time, and means we can mount higher walls than with a cement based product,” says Kristian Aamodt of Veidekke.

## **Tougher walls**

Another feature of the Leca walls is

that they are tougher than inner walls made with plaster. In a sports facility that is important, and ensures the walls will demand less maintenance.

“Especially in the wet areas like showers and wardrobes the Leca block is the best choice. The walls are very robust, even when assembled with the glue. We can very quickly start putting finishing renders on the wall”, says Aamodt.

Due to the large areas that needed to be covered, the render was applied to the wall with a spray. The sprayable render means a lot more square metres can be covered in a day.



**Eika sports centre** outside Oslo is a huge expansion of the existing centre. Almost all the inner walls are built with Leca Lettveggblokk.

**Hege Anker-Jensen from Leca** inspects firewalls built with Leca Basicblock. Almost all the inner walls of the sports centre are constructed with Leca Lettveggblokk (top).

**Leca's technical personnel** has been an important advisor in the project. Here the foreman Marius Aamodt, mason Truls Eliassen and Kristian Aamodt discuss the result with Jan Øyvind Christensen and Hege Anker-Jensen from Leca (bottom).

#### Leca facts

**Facility** Eika sports centre

**Location** Ås, Norway

**Developer** Studentsamskipnaden i Ås, SiÅS

**Contractor** Veidekke Entreprenør AS

**Leca products** Leca Lettvegg 118, Leca Basicblokk

**Weber products** Weber render, Weber Stone Fix, Weber wet area system



## REDUCING ENERGY COSTS

**FINLAND** A Finnish family built two low-energy houses with Leca® Design Sandwich blocks. It is their second house built with Leca®.

Matti Heikkilä is a construction entrepreneur and the managing director of Projektimestarit Oy. He was determined that he wanted to build the new houses to a low-energy standard. Previous experiences lead him to choose Leca Sandwich blocks.

“In 2003, I built our first single family house from Leca Term Sandwich blocks. I was very pleased with the solution at the time, and after having lived in a wooden house in between, I definitely wanted to build a new Leca block house, where I could take advantage of the success of the previous block house,” Matti Heikkilä says.

### **Saves energy**

When the lead-ins and connections are properly done, blockhouses become very airtight. This is an important feature because airtightness is a central part of energy efficiency.

“Due to their mass, blocks possess good thermal and sound insulation properties compared with wooden buildings,” says head designer Veikko Ahonen from Arkkitehtuuritoimisto Ahonen Veikko Oy.

He considered the advantages of building in Leca before he decided to use Leca Sandwich blocks for the family houses.

“It is quick to construct the large masonry units. The frame of the building, the heat insulation, and outer shell, with the exception of surfacing, rise at the same time. Leca blocks are easy to work with and are flexible building units for many forms. Leca blocks are highly suitable for constructions on sloped locations, because the entire facade, from the basement wall upwards, can be made from the same material,” says Ahonen.

### **Soundproofed**

The house is built on a slope in a suburb of Helsinki. Leca Sandwich blocks meant they could effectively take advantage of the difficult slope.

“I like stone houses, because they do not click and clack and one can ensure that everyone can enjoy their own desired peace.”

The house also features audio and video systems and smart house technology, all of which can be controlled via smartphones or tablets.



**Large windows and skylights** make the houses bright. The mass of the stone house evens out temperature fluctuations and saves energy.

**Matti Heikkilä** (right) was determined he wanted a low-energy house built with Leca Sandwich block.

**The houses are set** in a slope and close together. The swimming pools are made with Leca shuttering blocks.



#### Leca facts

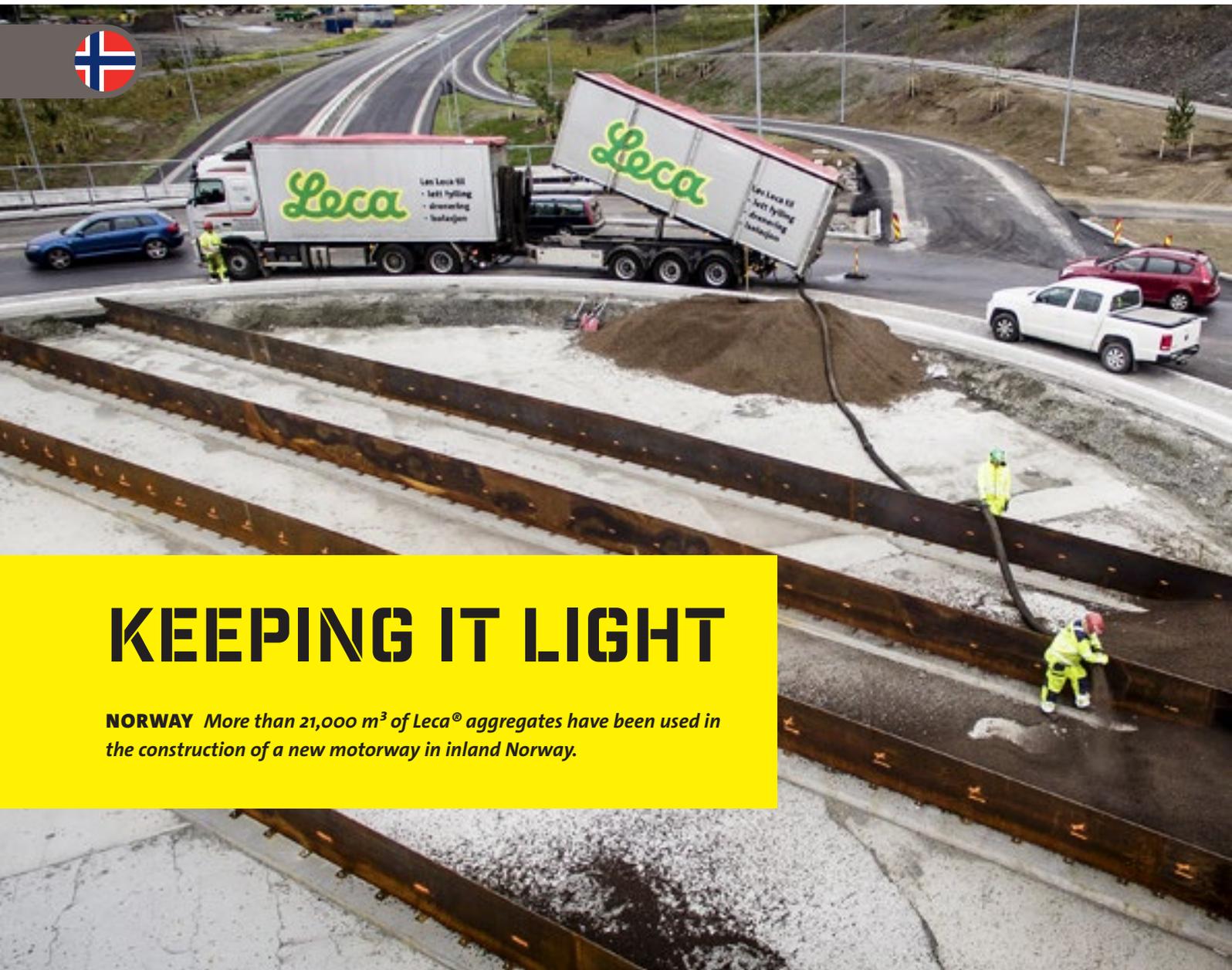
**Client** Matti Heikkilä

**Frame contractor** Aja Rakennus Oy

**Architect** Arkkitehuritoimisto Ahonen Veikko Oy

**Structural engineering** Insinööritoimisto Pietiläinen & Gabrielsson Oy

**Leca products** Leca sandwich block LTH-420, Kahi separating wall block, Leca shuttering blocks (in swimming pools)



# KEEPING IT LIGHT

**NORWAY** *More than 21,000 m<sup>3</sup> of Leca® aggregates have been used in the construction of a new motorway in inland Norway.*

The new highway in the inland of Norway is 9.3km long, including a 1.7km long tunnel that bypasses the small town of Gran. Approaching the opening day, the construction site is busy.

Using Leca in the ground within road construction is a well-known and tested method. The Leca aggregates are put in the construction of the road to insulate from frost and prevent settlement.

## **Anti-frost**

“More than 20,000 cubic metres of Leca aggregates are used in the tunnel. Above that there is a layer

of coarse rocks and more fine stone masses. On top there is, of course, asphalt,” says construction manager Ole Helge Steinsrud of NCC.

Leca aggregates are often also used to avoid settlement where the ground is unstable, such as when constructing roads or buildings in areas with clay.

The light weight of Leca aggregates is a huge advantage in many situations. On two roundabouts built on top of culverts there will be huge flower and plant beds. To reduce the weight of the beds, Leca aggregate is filled to a level prior to capping with a top layer of soil.

## **Easy to lay**

Installing hundreds of cubic metres within a busy carriageway undergoing construction work is a challenge. The solution was blowing the aggregates in place through a series of hoses.

“It is very easy to lay out the Leca aggregates by blowing them in place like this. Using a typical machine such as a tracked excavator or blade would not be possible because of the bulkheads between the different plant beds,” says foreman Bjørn Løvseth with NCC.



**To reduce the weight** of the roundabout on Highway 4 in Norway, the developer chose Leca aggregates as filling for the plant beds. The aggregates were blown in place through a series of hoses.

**Blowing the Leca aggregates** in place is easy and effective. Using hoses with a large diameter the operator has good control and can direct the aggregate in to position.

#### Leca facts

**Facility** Highway 4

**Location** Gran, Norway

**Developer** Norwegian Public Roads Administration

**Contractor** NCC

**Leca products** Leca aggregates

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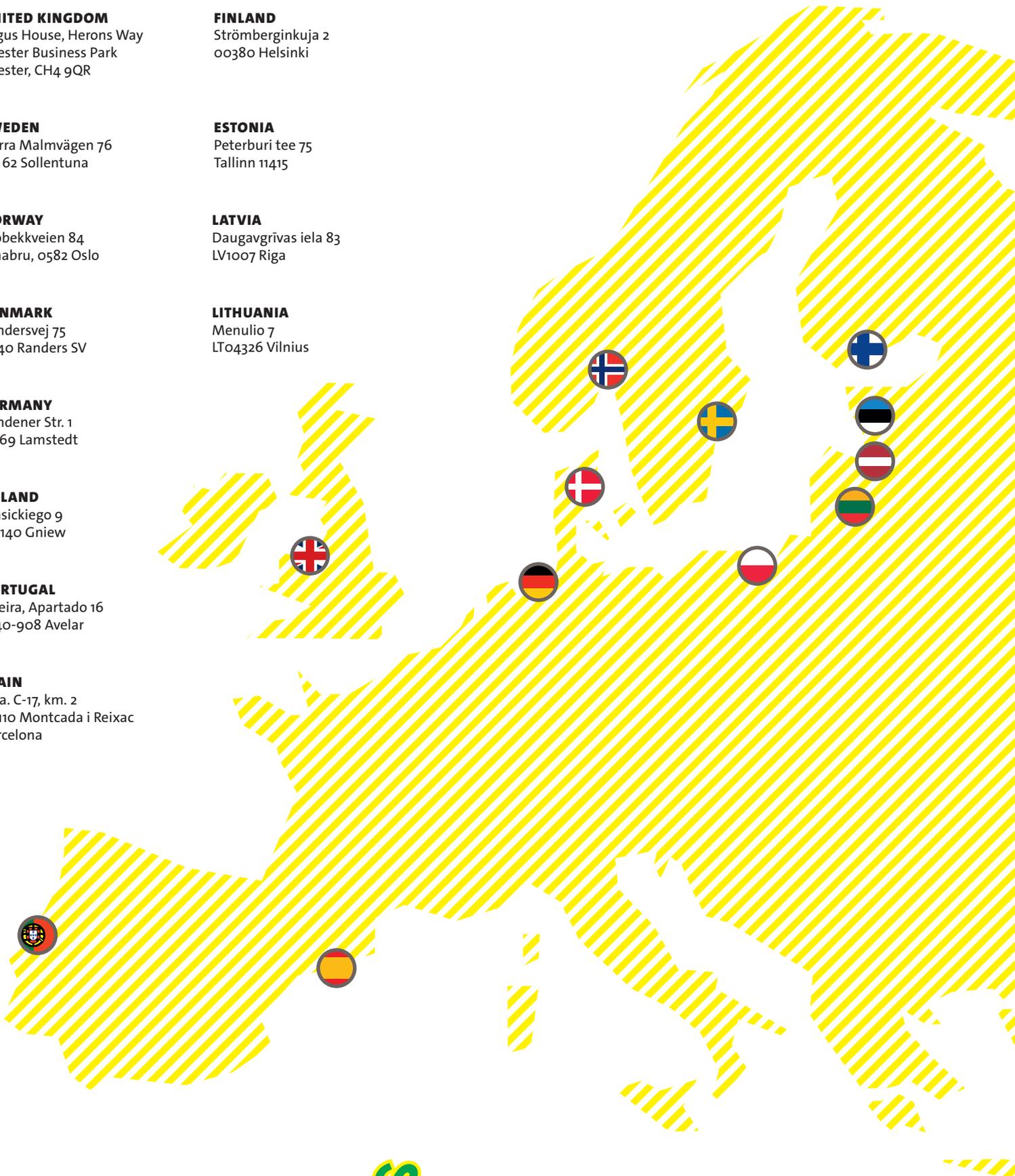
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