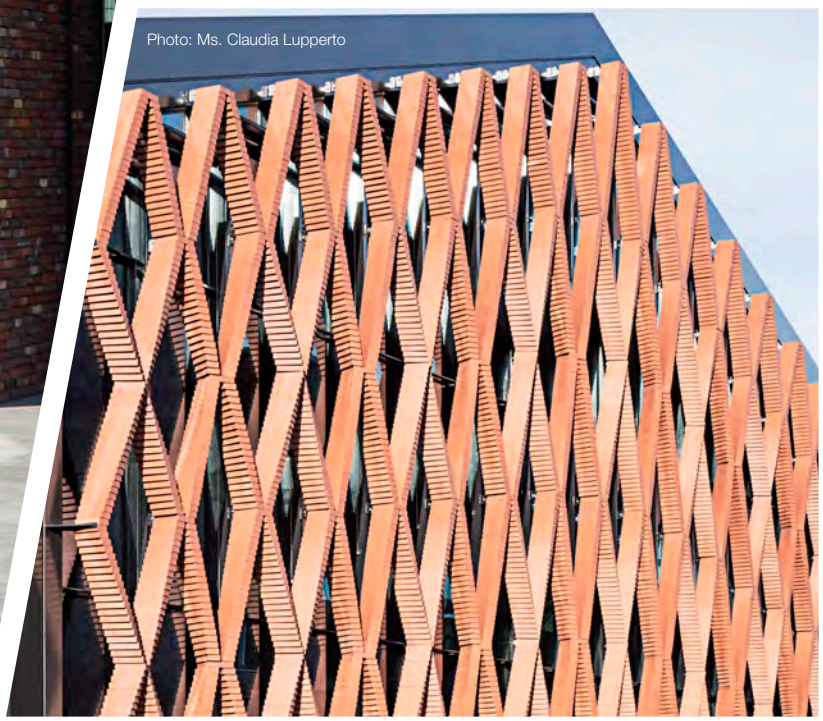
Tiles & Bricks Europe
Ceramics, quality for life

Photo: Ruud Peijnenburg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CLAY MASONRY PRODUCTS: MATERIALS FOR A BETTER LIFE

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INTRODUCTION

Town halls, monuments as well as numerous residential homes all testify to the enduring appeal of clay as a building material and to its unique durability.

Clay building products such as bricks, blocks, roof tiles and pavers continue to be very popular today, not just for their longevity, but also for their innovative versatility and technical performances.

In the following pages, we will look more closely at what makes clay masonry products an outstanding choice of construction material that fits perfectly into our modern times.

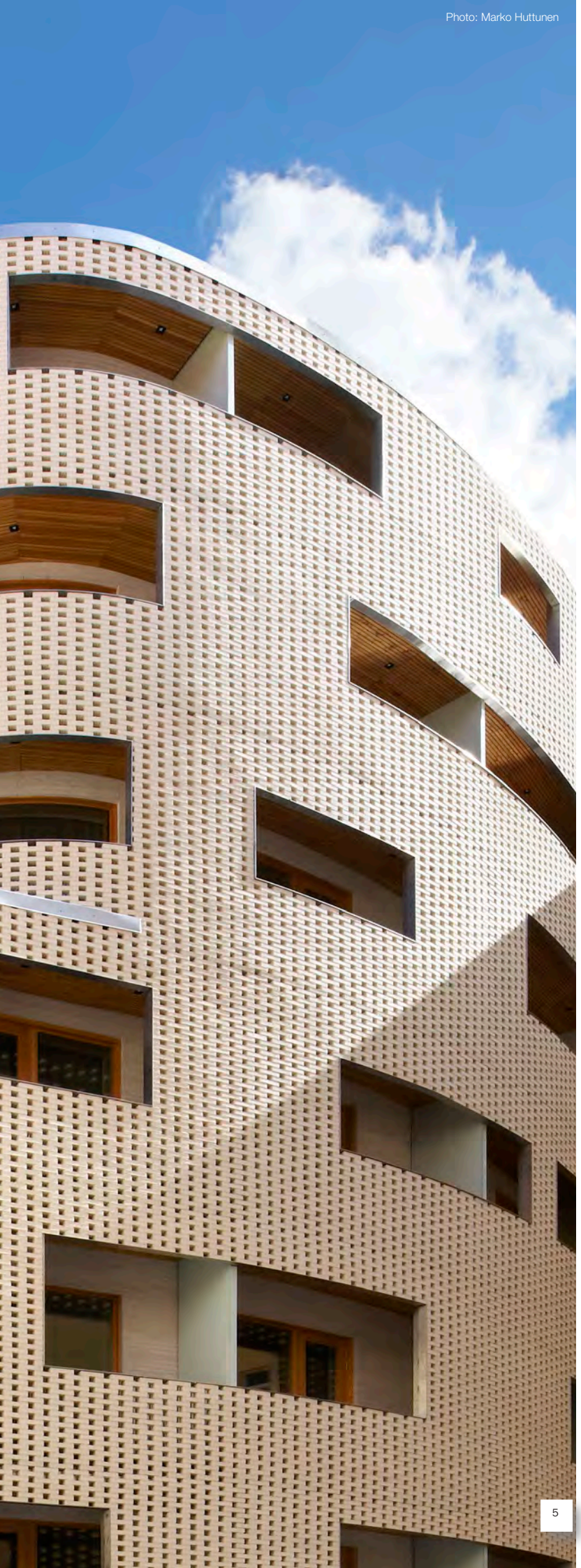


Photo: Marko Huttunen

1

DESIGNS FOR THE FUTURE

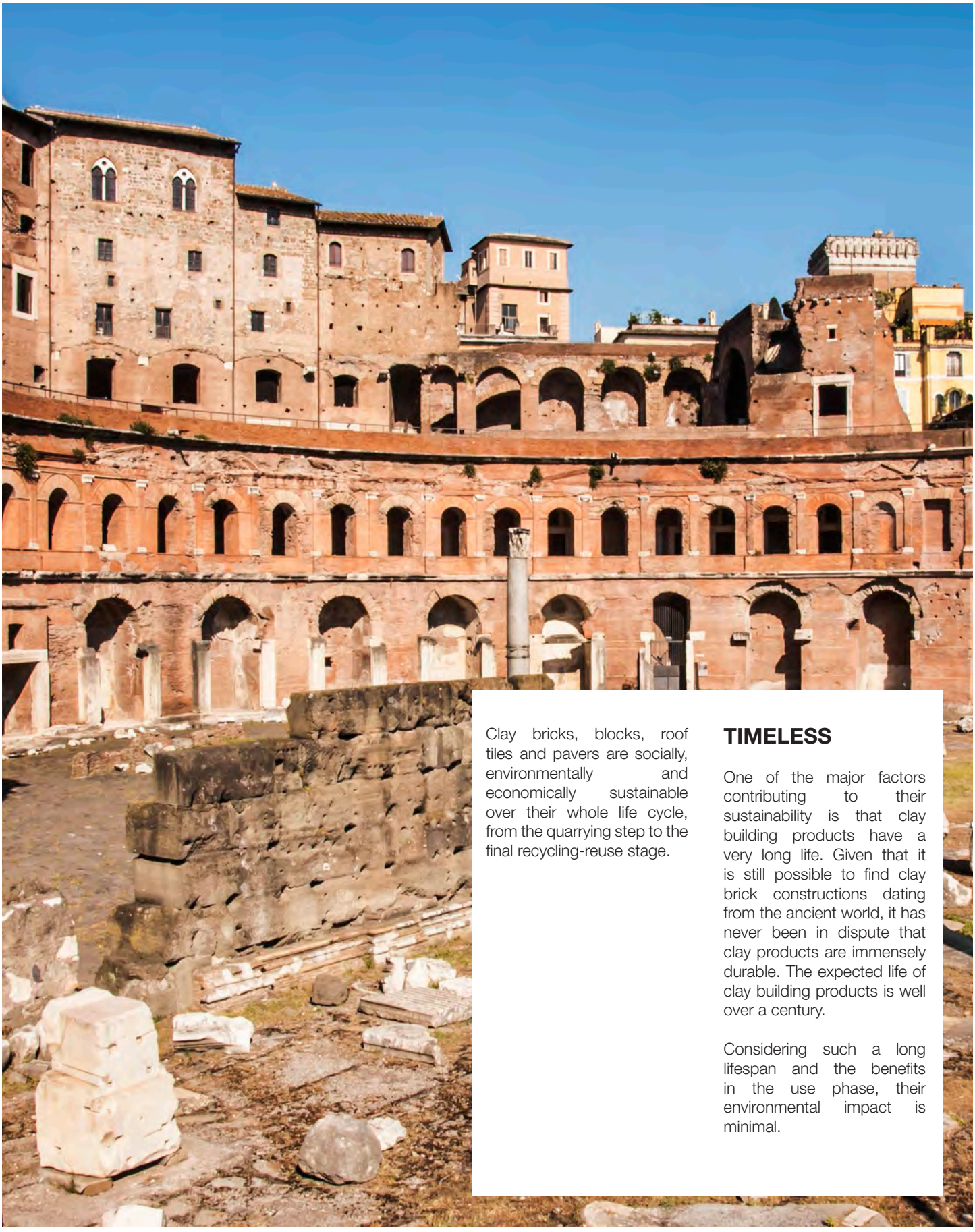
ENDLESSLY INNOVATIVE

Due to the versatility of clay building products, they can be easily adapted to new requirements, techniques and methods of construction. The development and continuous improvement of clay bricks and blocks, roof tiles and pavers, their technical performance and the constant introduction of new designs, shapes and colours make them perfectly suitable to innovative and future-oriented buildings.

ARCHITECTURAL HERITAGE

The clay construction products industry understands and values the regional dimension of the European building tradition. In this regard, the large range of clay building products helps preserve local architecture across Europe. Furthermore, their long lifecycle allows for the trans-generational transfer of this cultural heritage across centuries.

2 SIMPLY SUSTAINABLE



Clay bricks, blocks, roof tiles and pavers are socially, environmentally and economically sustainable over their whole life cycle, from the quarrying step to the final recycling-reuse stage.

TIMELESS

One of the major factors contributing to their sustainability is that clay building products have a very long life. Given that it is still possible to find clay brick constructions dating from the ancient world, it has never been in dispute that clay products are immensely durable. The expected life of clay building products is well over a century.

Considering such a long lifespan and the benefits in the use phase, their environmental impact is minimal.

NATURAL MATERIALS

Clay bricks, blocks, roof tiles and pavers are produced in Europe with local and environmentally-friendly materials – clay and water – and, unlike many other building products where large distances of transportation may be involved, are produced locally for local markets. This close proximity to source materials means that transport emissions are very low.

Furthermore, the impact on biodiversity is minimal, as extraction of clay does not require large areas and clay pits and riverbanks are restored and returned to their natural state.

HIGHLY EFFICIENT PRODUCTION PROCESS

The brick production process is highly energy efficient, keeping CO_2 emissions to a minimum. At the end of the building's life cycle clay masonry products can be reused or recycled for other purposes such as road construction or as a secondary raw material.

MEASURE OF SUSTAINABILITY

Construction materials are always used as building elements. Therefore, the scope of a proper sustainability assessment needs to focus on the entire building and to consider the whole life cycle.

In line with the relevant standardisation document (EN 15643), such assessment has to address not only the environmental pillar of sustainability, but also the social and economic impact.

The clay building industry has taken the challenge of sustainability seriously. The European association TBE - Tiles and Bricks Europe – has developed guidelines (Product Category Rules - PCR) which provide harmonised rules for developing Environmental Product Declarations (EPDs).

The TBE PCR are based on a cradle-to-grave approach which also takes into account the benefits of reuse and recycling considering a reference service life of 150 years. Moreover, the PCR strongly recommend to declare additional environmental indicators to the ones defined in EN 15804.

3 AS SAFE AS HOUSES

STRONG UNDER PRESSURE

A brick house naturally provides a safe home. Thanks to its mechanical resistance, it's more stable than most other materials with insulating properties. When loads are applied on a clay brick/block wall, it will remain secure.

The properties of clay masonry units are very stable even under different moisture conditions. Long-term moisture expansion or shrinkage is very low as is the coefficient of thermal expansion.

FIRE RESISTANT

Clay buildings enhance occupants' personal safety by minimising the risk fire poses due to their natural fire resistance. Fired at high temperatures, bricks, blocks and roof tiles are incombustible and are therefore able to prevent the spread of fire to other rooms or neighbouring houses. A further advantage of clay building products is that they will not interact with fire to produce hazardous combustion gases. This gives occupants a greater chance to exit a burning building safely.

Clay bricks and blocks meet the highest standards of reaction to fire. Brick houses will endure less structural damage during a fire and through their capacity to block the spread of fire will also reduce the risk of a building burning down during construction.

EARTHQUAKE RESISTANT

Brick houses provide stability in the face of numerous natural hazards, namely earthquakes, avalanches and landslides. Well designed and executed houses built with new clay masonry products can withstand such extraordinary impacts even better.

ROBUST AGAINST EXTREME WEATHER

In recent decades climate change has resulted in a greater incidence of extreme weather. Clay products are well adapted to meet the challenges extreme weather poses, in particular when it comes to flooding. In 2002, after severe flooding occurred, research work was conducted in Austria into the effects of water penetrating into buildings.

The analysis demonstrated that clay masonry products greatly reduce the damage caused by flooding and preserve the usability of buildings. Depending on the design of the building, brick houses offer occupants a safe house in many different weather conditions as well as keep repair costs down should disaster strike.

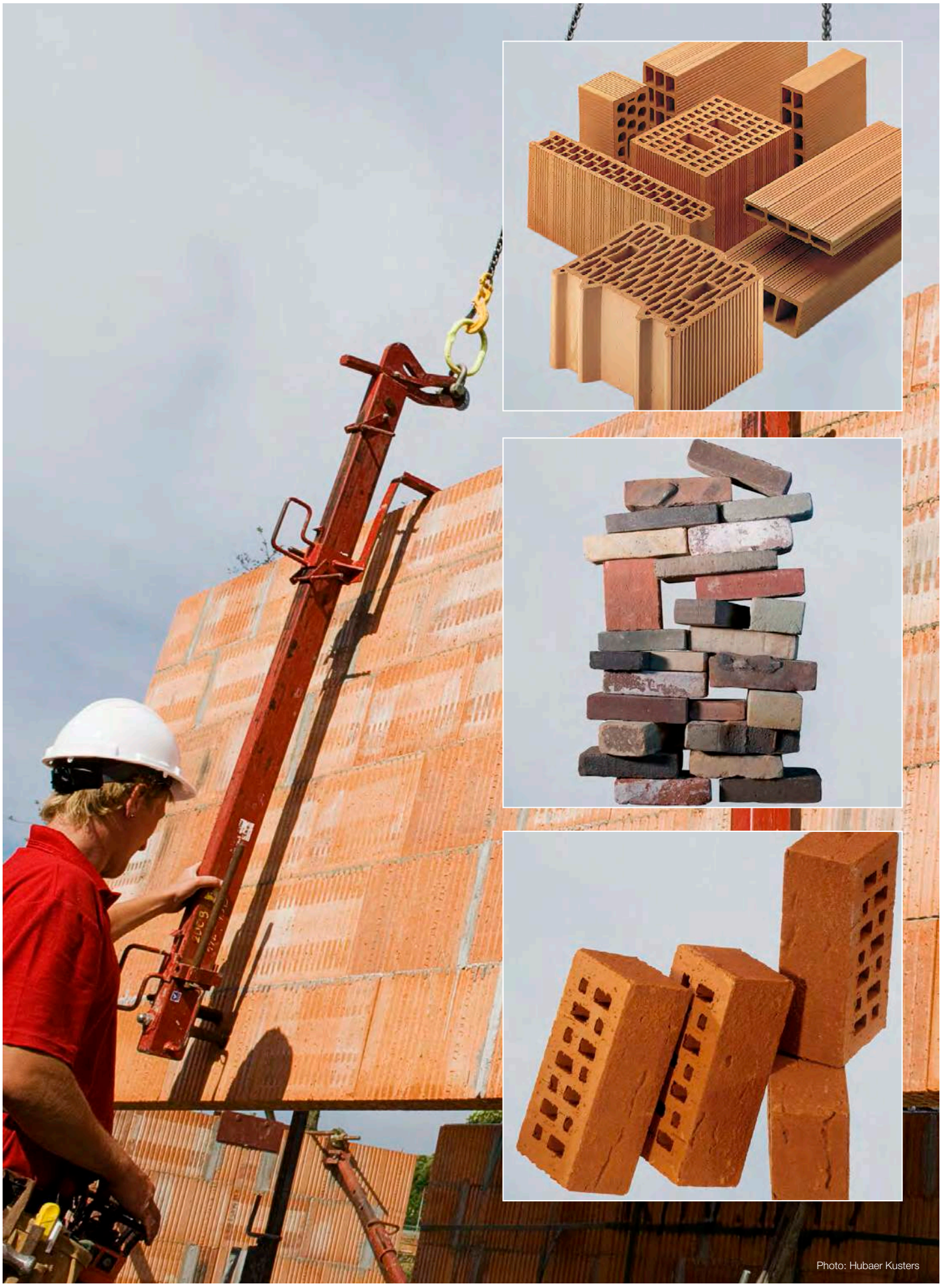


Photo: Hubaer Kusters

“MATERIALS FOR A BETTER LIFE”

Photo: Tomas Ghisellini

4 COMFORT AND CLEAN AIR

BEST FOR INDOOR AIR QUALITY

People spend approximately 90% of their life time indoors. It is therefore important that indoor air is of optimal quality so as to prevent any health problems such as asthma or allergies from worsening. Clay masonry materials help to prevent the 'sick building syndrome'. Unlike other construction materials which often contain or are coated with harmful substances such as volatile organic compounds, formaldehyde, flame retardants and terpenes, etc., clay masonry materials are made of minerals and free from such air pollutants. As a result, indoor air in a building using clay masonry materials is healthy and less likely to provoke allergies, tiredness and headaches among occupants.

Since clay products do not need any treatment with chemicals to enhance their fire resistance or durability, they do not release preservative chemicals into the ground and drinking water or soil.

HUMIDITY-FREE

Another way clay masonry materials contribute to a healthy environment is their capacity to absorb high air humidity and release it when conditions become dry again. Clay products help to balance moisture inside the building and prevent condensation from accumulating.

This results in a stable indoor climate that does not require expensive mechanical ventilation systems to regulate air quality and reduces the risk of mould.

SMOG SHIELD

Massive clay brick walls will also help shield occupants from the modern-day urban hazard of 'electro smog', such as radiation from an antenna. Only little electromagnetic radiation can enter the interior when using clay brick/block walls so that the occupants are ensured a healthy and safe environment indoors.

PEACE AND QUIET

Just as bricks protect against electro smog, so they can protect against noise. This is of particular benefit in heavily built-up areas where traffic can be dense and neighbours can live close by. A recent survey of 33 European countries by the Dutch National Institute for Public Health and the Environment shows the true extent and negative impact noise can have on human health.

Brick walls provide relief from noise thanks to their capacity to reliably absorb low frequency sounds thus helping to cut out external traffic noise, bass music coming from other buildings and dampening any sound coming from inside a building such as loud TV programmes. This natural sound protection system means that the inside of a well-designed brick building remains pleasantly quiet when it's noisy outside and vice versa.

WARM IN WINTER, COOL IN SUMMER

Buildings constructed with clay masonry products are able to provide a perfect indoor temperature all year round due to the good thermal mass properties of bricks and blocks. In general, thermal mass describes the capacity of materials to store heat. The ability to store heat is a combination of the mass and the thermal capacity that are both on an excellent level for clay masonry units.

On hot summer days, clay brick/block walls will absorb and store heat, which will be released back to the air when the outside temperature decreases in the evening and during the night. This fact enables buildings with good thermal mass to avoid overheating during hot summer days with less need for cooling making them robust against climate change.

During cold winter days, a higher thermal mass will keep rooms warm for longer even if the heating is interrupted. In this way, occupants of a clay brick/block building can enjoy the comfort of optimal indoor temperatures all year round.

5 ENERGY EFFICIENCY

INSULATING PLUS STORING HEAT

Today, energy is considered as a precious resource. It's no wonder then that the European Union has been introducing legislation to reduce the energy consumption of buildings. Clay masonry materials significantly help to save energy.

The high thermal mass of clay bricks and blocks functions like a natural air conditioning, guaranteeing a comfortable indoor climate in all seasons, as it does not cool down quickly in winter or overheat in summer. Specially designed clay blocks for external walls have excellent thermal insulation properties.

As a result, clay bricks/blocks help to keep the energy consumption of a building low and reduce the overall contribution of such a building to global warming. Thanks to that, Nearly Zero Energy Buildings and active houses are being built with clay construction products already today.

6 AFFORDABILITY

ECONOMICAL

Unlike other solutions currently on the market, clay masonry products ensure an easy construction method. Time has indeed proven that everyone can build with bricks. Consequently, a house built with clay bricks and blocks is less likely to suffer from expensive structural defects and during its erection it is easy to conduct quality control checks on site.

Comparative surveys of various construction frameworks have shown that clay buildings have relatively low entire costs over the whole life cycle. Provided that the technical performance is comparable a clay building can be cheaper than buildings made of any other material.

MINIMAL MAINTENANCE

Those who choose to invest in clay brick/block constructions need to fear less about running up maintenance costs. According to a study developed in Germany in 2008, a two-storey house made of clay products is estimated to cost up to 24% less in terms of maintenance costs over 80 years than comparable construction materials.

Many running costs can be kept low due to the long life of a clay building. The cost of preservation and maintenance of the facades is comparatively low too.

Photo: Norbert Prommer

Photo: Ruud Peijnenburg

LONG LIFESPAN

Studies have shown that the average life of a building made of clay is 150 years. Many clay brick houses exist for hundreds of years.

Clay houses offer other advantages on the maintenance and renovation front as well. Clay buildings can be easily adapted to the changing needs of residents and refurbished several times during their long life cycle without the need to call on costly alternatives. Heavy objects can be mounted on clay brick walls wherever necessary and it is easy to make changes to the lining of pipes and wires.

Should a clay brick house be subject to a natural disaster like a flood or a debris flow, not only will it withstand the disaster better than many other types of construction, it will also cost comparatively less to get the house back into operation again.

All these factors contribute to keeping maintenance, preservation and renovation costs to a minimum and ensure the longevity of the building. This is important when it comes the re-sale of a property: the residual value of a clay brick house after one generation's use is kept significantly higher than for alternatively constructed buildings, as they maintain a higher economic value over time.

ENERGY SAVING

Every home owner wants to find ways to reduce their monthly energy bills. With a clay building, cutting such costs comes easily as the building comes with in-built natural energy saving devices. Thanks to their excellent thermal properties, clay masonry materials keep inside temperatures at a comfortable level all year round without the need for a mechanical ventilation. This contributes to maintaining energy bills low.

Photo: Marko Huttunen

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