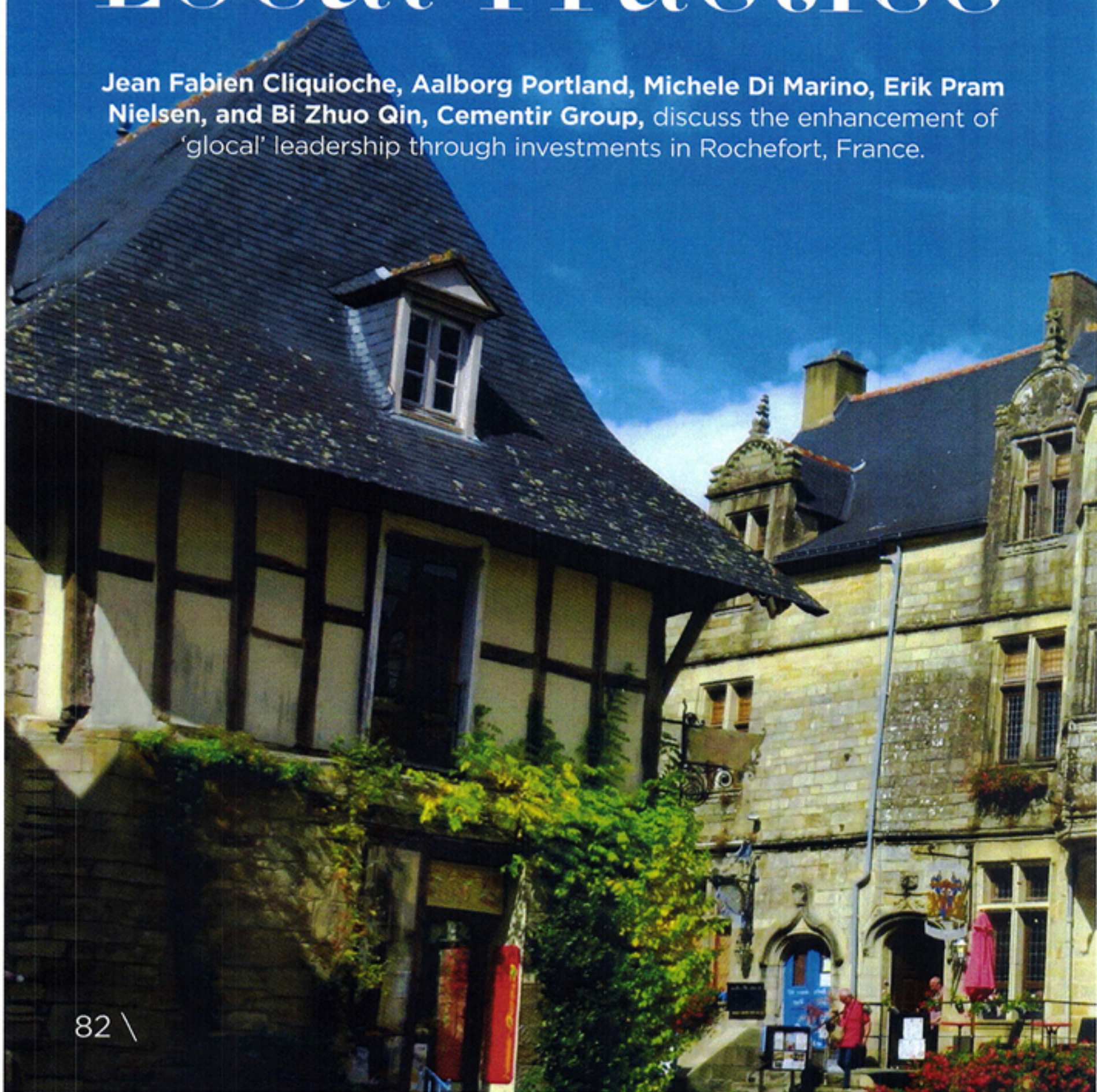


# GLOBAL APPROACH in LOCAL Practice

Jean Fabien Cliquioche, Aalborg Portland, Michele Di Marino, Erik Pram Nielsen, and Bi Zhuo Qin, Cementir Group, discuss the enhancement of 'glocal' leadership through investments in Rochefort, France.





### Terminal in Rochefort

France has traditionally been one of the largest markets in Europe for white cement consumption, with a mature and high-demand customer base for quality, value-added services, and innovation. Aalborg White® Cement, produced in Cementir's European plant in Aalborg, Denmark, has been present in this market for many years. Within the strategic path of developing key markets, with a direct and local approach alongside, Aalborg Portland began in 2013 – 2014 to further develop its presence by enhancing the route to a market model. This was done by establishing a local sales structure with the opening of Aalborg Portland France, as well as by investing into the logistics platform with a long-term perspective. In 2014, Aalborg Portland underwent a demanding certification process, which resulted in Aalborg White products becoming certified under Norme Francaise. After obtaining this highly recognised certification in 2015, Aalborg Portland has paved the way for expanding business activities in its French market, namely the import terminal in Rochefort.

After a series of investigations and a comparison of pros and cons, the river port of Rochefort, close to

La Rochelle, was determined to be the best location for a cement storage terminal. This was decided both for the highly-efficient logistics of the location and environmental protection considerations. Furthermore, cement could be shipped directly to France from the cement plant in Aalborg, which would significantly reduce environmental pollution.

"Cementir Group regards the Rochefort Terminal as an important strategic deployment of its white cement business in a key market like France," said Michele Di Marino, Chief of Sales, Marketing, and Commercial Development Officer at Cementir Holding. "With approximately €3 million investment, Aalborg White has strengthened its local presence in France, where the supply chain capability for French customers with minimal transport is the primary matter to be emphasised. This strategic investment will also further develop Aalborg White's leading position in the French white cement market, as part of a long-term commitment to customers in France, with continuous product supply and a stable high-level services offering."







Aalborg White Terminal in Rochefort, France.



Construction of terminal foundations.



Installation of cement silos.



A safe and reliable automated operation system on truck loading.

### Project challenges

In 2015, urbanism service in the city of Rochefort limited maximum construction height to 15 m. With this limitation, the parallel piped flat silo was designed and adopted to replace the normal cylinder silo. From field investigation, scheme development, discussion, and plan adjustment, through to final confirmation, the silo spent a total of six months with tight collaboration between several parties, ultimately conquering the difficulty in silo shape.

The final plan was to erect two 2450 m<sup>3</sup> metallic cells next to each other. The unique structure required a 600 m<sup>2</sup> concrete slab to be poured as a foundation. Each foot of the silo was attached to a concrete block of about 10 m<sup>3</sup>, which itself rested on between one and three metal piles of 30 m, in order to reach the hard rock under the surface. In total, 100 piles were used to ensure 6500 t of cement could be held when the silo was full.

### High efficiency and a green white cement terminal

The construction of terminal foundations started in August 2016 and lasted for three months. Assembly of the "huge Meccano" began in December 2016, with 24 bottoms that collect cement. This project was completed in the middle of 2017. During the same period CCI, the public administration of the port, installed the underground pipeline, which connects the shore to the silo at a 70 m distance.

Up to 3800 t of cement could be loaded from either traditional bulk carriers or self-unloading vessels to a cement silo, via an underground pipeline.

A self-discharging vessel could deliver its 3500 t of white cement in 20 – 22 hours without stopping.

In order to load trucks, the station is fed by two vertical screws, each of which collects cement from Silo 1 or Silo 2, via three horizontal screw conveyors placed under each silo. Thus, the loading of a 30 t cement tank could be completed in less than 20 min. The aim of the vertical screws is to convey large quantities of cement, with the purpose of space saving, easy maintenance, and being pollution free.

High-pressure dense-phase pneumatic conveying systems are the key technique used to transfer white cement from ship to silo. To keep a green and dustless loading process, three air extraction machines pump 6000 m<sup>3</sup>/hour of cement, with inside dust filters, are installed on top of the two silos. This system successfully filters out 99.9% of dust.

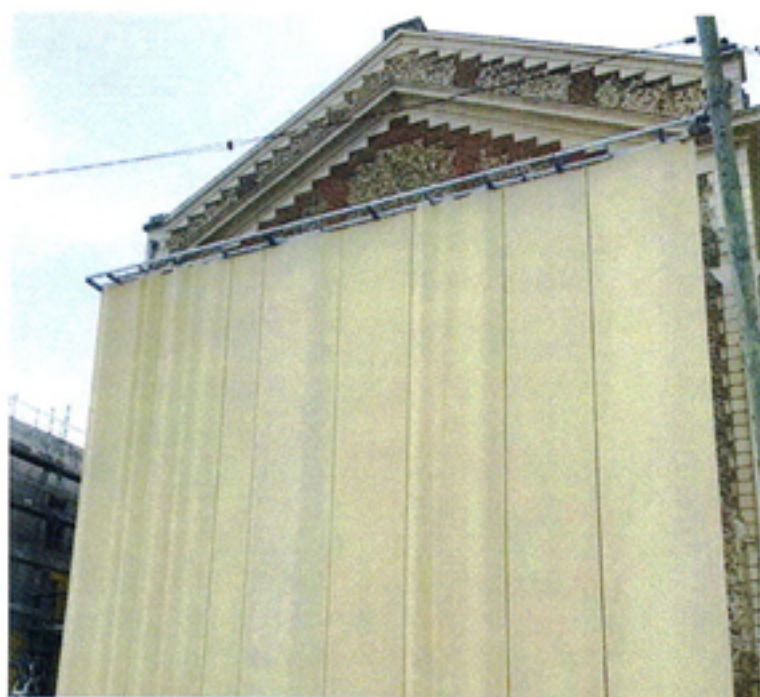
Unlike grey cement, colour is the most crucial quality index of a white cement product. This strict quality control is managed by the Aalborg Cement Quality Center. White cement quality, including its white colour, is monitored and controlled in the Aalborg plant throughout the whole production process. A cement sample is taken to the boat for conformance testing before being shipped to the Rochefort Terminal. The cement pipeline is dedicated to white cement product conveying, meaning there is no risk of cross pollution. A sample survey of each silo is required four times each year by the Aalborg Cement Quality Centre to ensure cement quality.



With regards to energy saving, Aalborg invested in the installation of a 400 KVA transformer to feed different motors of the silo structure. Yearly average energy consumption is about 4500 KWh/month, which is below early estimations.

### **A safe and reliable automated operation system**

Unloading and loading cement operations are carried out by an automated control system. The terminal manager



HPC facade of Evreux Theatre in France.



Precast concrete facade of multi-sports hall building for a polytechnique school in France.



Precast artificial paving stone application in gardening.

decides which silo to fill and controls the filling of each silo's different captors. When a silo is full, the loading screws can be controlled and driven through a remote management system, which can also carry out daily maintenance operations.

Truck loadings are controlled by a weighbridge and the required weight of cement or maximum weight of a truck (44 t) can be set in the management system.

The fully-automated loading system could be conducted by truck drivers alone. However, from a security perspective, a terminal manager should be employed to ensure the onsite safety of every subcontractor and driver. The Rochefort terminal set safety instructions for daily operation. For example, it is forbidden for a driver to climb onto his bulk trailer via a little scale. A safety staircase is instead required for drivers to get on top of trailers from the first level of a loading station and drivers are asked to go down to the control office to launch loading when putting a spout in place.

### **Aalborg InWhite: Cementir Group's white innovation engine**

An innovation programme for white cement, Aalborg InWhite has the purpose of generating a prioritised and actionable pipeline of global initiatives, with high potential for customer value. This aims to provide new solutions for well-known applications or completely new applications for white cement based products.

Cementir Group creates customer value by developing and redefining sustainable solutions in different levels of customised services. "Cementir wants to challenge the traditional way of looking at white cement as mainly an aesthetic and architectural building material," said Di Marino. "There is untapped potential to further develop a customer's business with white cement that, as a global leader, Cementir has the mission to make available to its partners."

In the last 12 months, a series of cutting edge white cement application technologies have been triggered under the new Aalborg InWhite Solution umbrella, fed by Cementir's global market knowledges, a strong industrial network, and its authoritative research and quality centre, based in Denmark.

It leverages the unique technical characteristics of Aalborg White cement for some emerging but rapidly expanding applications. These include ultra high-performance concrete (UHPC) and glass fibre reinforced concrete (GRC), which require high levels of chemical purity and the excellent mechanical properties of the concrete and which can be made with advanced production technologies. Such technologies could help to implement labour cost savings and simplify the construction process, which fully support the megatrends in society, including the following:

- Low specific weight per m<sup>2</sup>.
- Reduced thickness to enable more efficient use of the interior spaces of a building.
- Surfaces produced in a single process to avoid additional treatments.