

Application of AAC in the Caribbean





DELFIN'S

beach resort bonaire

It all began in 2013 as a small project and has over the past 10 years developed into a recognized building culture - the application of AAC in the Caribbean. This article describes an extraordinary project in an exceptional environment, where the building material can exploit its full potential and showcase all its advantages. Combining technical functionality with aesthetic design flexibility – AAC in its purest form providing creative freedom with all its facets.

The Dutch Caribbean islands of Aruba and Bonaire have discovered AAC. In recent years, various projects making use of AAC were planned, constructed, and handed over to the client, with several hundreds of projects completed in total. This development is expected to only mark the beginning of a long and successful story.

Application of AAC at its best!



The reason for the use of AAC, which is not produced on the Caribbean islands, is the circumstance that the building materials necessary for the construction of buildings are not only difficult to acquire on the islands, but also fluctuate greatly in price and are not always of sufficient quality. In addition, skilled construction workers are rare, even though professional training, knowledge and skill of the available workers

are above average. As a consequence, traditional construction methods are often associated with delays in completion due to the scarcity of high-quality building materials and shortage of work forces.

A few years ago, these conditions prompted the project developer Roosdom Tjihuis from Rijssen in the Netherlands to introduce and establish a new build-



Villa LU features a particularly aesthetically pleasing cantilevered balcony.

ing system on the island of Bonaire. The aim was to reconcile efficiency and quality, for which AAC provides particularly well-suited solutions.

Various suitable construction methods, including timber construction, classic reinforced concrete, and AAC were considered, evaluated and compared. For the technical evaluation of the various systems,

locally relevant criteria were taken into account, such as proximity to the ocean, ambient temperatures and climatic conditions, ground and subsoil conditions, and insect infestation related to termites. On evaluation of all technical particularities of the various systems and materials, and considering the characteristics of the local construction industry, AAC was found to offer optimum solutions for this region and thus selected as the material of choice for the realization of a project on the fabulous island of Bonaire, a dreamlike holiday destination.

In the meantime, various villas, apartment blocks, industrial buildings, bars, and restaurants have been conceptualized and built with AAC, using the material either for the entire structure or for some of its components. The Ytong production facilities Meppel and Vuren in the Netherlands supplied the AAC products for the projects, including wall panels in component thicknesses of 140 – 200 mm and ceiling panels in thicknesses of 150 – 175 mm.

The islands of Bonaire and Aruba belong to the so-called ABC Islands, where the letters stand for the first letter of the island name (A – Aruba / B – Bonaire / C – Curacao). The Caribbean consists of a total of six islands, including the ABC Islands, Sint Maarten, Sint Eustatius, and Saba.

From a planning and design point of view, the islands are to be divided into different wind zones, whereby Bonaire, Saba and Sint Eustatius are assigned to the BES Code 2018. The BES Code is a standard derived from the Eurocode by the Netherlands, which has not yet been officially introduced, but is already being implemented in practice. This set of rules specifies the various conditions associated with the islands, such as wind loads, earthquake zones and precipitation. Although the local buildings with up to three storeys plus roof are not particularly high, the wind loads to be applied may pose a challenge depending on the geometry of the supporting structure.

The stability of the various structures was provided by tension struts and plate action in the slabs, whereby the foundation is often dimensioned and designed as a slab foundation with cross-beams, in order to provide stability in case of possible underlying caves (grottoes). Also, in this context of structural stability and foundation design, the relatively light and robust AAC structure is an advantage.

Villa LU

Villa LU features a particularly aesthetically pleasing cantilevered balcony. In addition, as a result of the intricate geometry and the architect's specifications, a stability problem had to be addressed, which could not be solved with typical detailing of tension struts. Therefore, a structural frame was created on the upper floor, designed to accept wind loads and provide lateral stability through rigid connections between cross-beams and columns.





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Water villas

The water villas are located directly on the shoreline and are characterized by a colonial architecture. This type of structure was also built entirely of AAC panels. The full range of advantages of AAC could be exploited here, starting from architectural and conceptual design freedom and ranging from lightweight building construction, optimized properties concerning building physics and structural performance, to easy installation and reduced construction times.

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Multi-functional buildings

Multifunctional buildings are hybrid structures combining structural steel and AAC. The purpose of this type of building is to unite restaurants, offices, and public facilities under one roof. These buildings represent the tallest buildings on Bonaire. In the multifunctional buildings, the main structural frame is made of steel, while the building envelope is constructed in AAC and conventional concrete. For these types of structures, this combination offers the most sensible solution in view of the subsoil conditions. All internal partition walls in these structures are made of AAC.



Informa

Fact Box

Structural design
Architect
Development
Location

Peree Bouwadvies
Barkhuis Architects
Roosdom Tjihuis Bonaire / Rijssen Netherlands
Delfins Beachresort Bonaire, Caribbean

J.Terlage
D.Barkhuis
J.Kogelman

Impression of the construction phase.









Impression of the completed buildings – just dream!



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