



# Arab-German Yearbook 2018

*Construction and Consulting*

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# Preface

Due to the growth of the Arab population the need for sustainable, safe and intelligent city-concepts, including the creation of new places of residence is increasing. The seventh edition of the Arab-German Yearbook "Construction and Consulting" sets its focus specifically on urban development topics, where different chapters focus on the idea of the creation of a "smart-city".

Since 2011, Germany has generated a continued annual growth which amounted to 2.2% in 2017. The German economy is obviously booming more than ever. Germany is also the world champion in exports. Last year, Germany reached an all-time high with more than EUR 1,279 bn. With its GDP standing at € 3,263 bn, Germany is the biggest contributor to the European Union's economy, accounting for more than 20% of the GDP. This is exemplified by the execution of infrastructure projects in the GCC countries, as well as in sustainable environmental and energy projects in North Africa.

German companies and institutions have been long-term business partners for the Arab world and are well known for their high-quality services. To ensure a balanced and sustainable exchange, they are not only exporting top-notch products, but also bringing education and know-how along with it. Due to their unique and globally renowned experience and knowledge, German engineers, architects and constructors have a considerable impact on the construction sector in the Arab world.

In this publication, jointly accomplished Arab-German projects illustrate the continuing intensification of cooperation between Arab and German partners. The increasing attention for cooperation is also reflected by the success of the Arab-German Business Forum, which is organised by the Ghorfa for the 21st time this year.

The Ghorfa Arab-German Chamber of Commerce and Industry has a powerful network consisting of both institutional and entrepreneurial decision makers from Arab countries and from Germany. As the competence centre for business relations between Germany and the Arab world, Ghorfa promotes and strengthens business relations between Germany and the Arab countries in the fields of trade, industry, finance, and investment.

We would like to thank the German companies for their valuable contributions, Ms. Tatjana Arnold for her commitment and dedication to the publication and also Mr. Fahdl Al-Romaima for layout and design. We hope you enjoy reading this book and wish you inspiration for further reference projects.



Dr. Peter Ramsauer



Abdulaziz Al-Mikhlafla



Dr. Peter Ramsauer  
*President  
Federal Minister ret.*



Abdulaziz Al-Mikhlafla  
*Secretary General*

*» The Ministry of Health awarded the design of the new generation of primary care health centres to the Joint Venture of BW-Engineers and Office Mohamed Al Guwaihes. Over the next years the Ministry of Health plans to build hundreds of communal health centres across Saudi Arabia, to provide an easy and direct access to primary care to citizens. «*

Marc Eggert, Managing Partner Healthcare & Architecture and Albrecht Meyer,  
Project Manager, bw Engineers GmbH



## Urban Healthcare Facilities



An artist's impression of the new "Type L" centre with semi-translucent shading © BW-Engineers GmbH

# A New Generation of Health Centres in Saudi Arabia

## BW-Engineers GmbH

The Ministry of Health awarded the design of the new generation of primary care health centres to the Joint Venture of BW-Engineers and Office Mohamed Al Guwaihes.

Over the next years the Ministry of Health plans to build hundreds of communal health centres across Saudi Arabia, to provide an easy and direct access to primary care to citizens. The design reflects the Ministry's new corporate identity of modern and bright design, which is supported by the architects' selection of materials, colours and indirect daylight. The health centre prototype design is organized in three different sizes, which will be implemented in various cities and rural areas according to the local demand.

With this large repetition on various sites across the country, the project is predestined for BIM technology

(Building Information Modelling) by revealing efficiencies during design, construction, and operational phases. The implementation process is driven by BW-Engineers BIM group that is partly represented on the ISO BIM chapter.

## Supporting the Saudi Vision 2030

Following the concept of diversification and privatization, some centres will include complementary private sector functions such as health club, pharmacy and coffee shop. This will offload the capital costs from the ministry to focus on its core services of public health care.



The reception welcomes patients and serves as communal information point for health advice © BW-Engineers GmbH

In addition, the small centre types can be provided cost effectively in each community to enable a high service coverage for primary care. To achieve a high-quality design and fast construction, the buildings will be implemented in pre-cast concrete and standard façade modules. These façade modules are variable in design to suit local context for each individual centre to suit local context and urban planning.

## Efficient configuration

The large centre type ("Type L") has a gross floor area of 3,880 m<sup>2</sup> on three levels. All highly frequented functions are provided on the ground floor, such as pharmacy, maternity and child care, minor operations room, x-ray department and laboratory. The first floor contains all general clinics and examination rooms and specialist clinics

such as dentist practices, family clinics, dietary clinic, ophthalmology clinic, psychological clinic. The second floor is reserved for administration and seminar areas, as well as technical rooms.

Smaller prototypes "Type M" and "Type S" have a slightly reduced functional program to suit the demand of smaller communities in rural areas. An additional residential unit will be located on the site, to compensate for the shortage of suitable accommodation for nurses and doctors.

An additional study "Type XS" was developed with a significantly reduced functional program in a single-story building, but with the addition of small private sector areas. The first floor is added for staff accommodation and mezzanine spaces for private sector tenants, as required.



Wide corridors are indirectly lit with sufficient daylight © BW-Engineers GmbH



Health Centre "Type L" in Saudi-Arabia © BW-Engineers GmbH

## Modularity and Adaptability

The typology follows the idea of traditional monolithic building volumes with minimal roof light openings to provide light to the inner building alongside the two generous corridors. A regular building grid and façade grid allows a maximum of flexibility and sustainability over the life-span of the building to change room sizes and functions.

A flexible façade shading layer allows local adaptations to suit cultural and climatic context as the health centre prototype shall be implemented across Saudi Arabia. Examples include perforated metal, membranes, fritted glazing, and potentially also terracotta and wooden applications. This shading layer could be a contemporary interpretation of arabesque screens to ensure privacy from unwanted views into the clinic.

Further, the demand for healthcare provision differs in each community, so that each centre can be adapted easily given the modular grid design. In addition, the residential building can also be resized to suit the number of staff that needs to be provided with a flat on site.

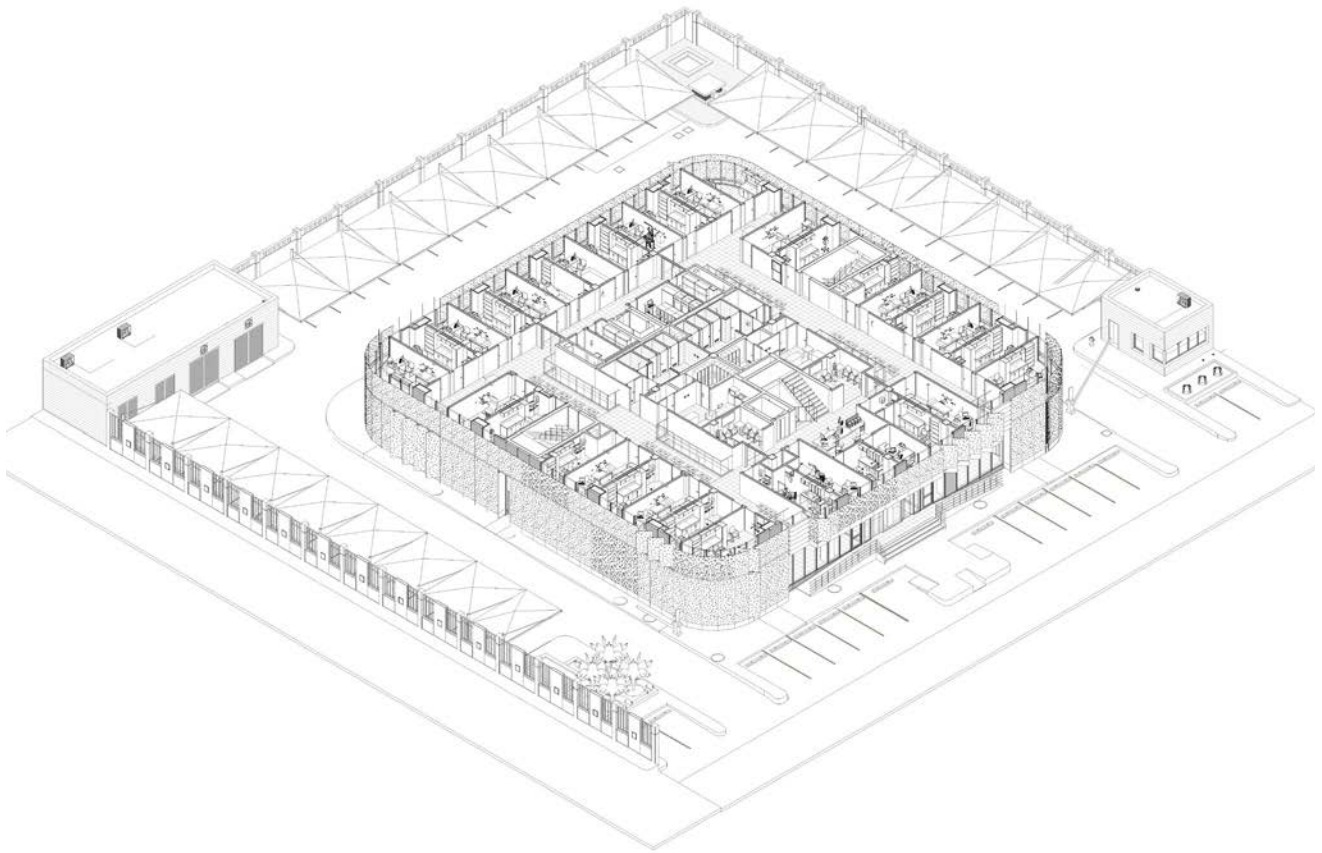
The design phase coincided with several ministerial strategic decisions in line with the transforming culture of Saudi Arabia. A significant change in functional design is the reunification of male and female entrances into one single entrance. The design team of BW-Engineers supported the Ministry with options and studies to enable meeting the new cultural and technical aspirations. Improvements ranged from standardized interior design guidelines for better patient experience to life safety standards.

## Knowledge Cooperation

The client Ministry of Health raised strong interest on using prefabrication and modular design. The selected design allows an extensive use of prefabrication for (a) structural modules, (b) façade modules, and (c) fit-out modules. Prefabrication systems take longer to set-up and are cost intensive initially, but benefits occur with large numbers of health centres. Further the quality and higher level of accuracy will ensure a better product. BW-Engineers developed the final design based on evaluation matrix of factors such as (1) cost, (2) time, (3) quality, and (4) flexibility. Where required, the design also leaves the option to apply conventional construction.



Simulation of façade effects during daytime and evening hours © BW-Engineers GmbH



Health Centre „Type M“ isometric section view © BW-Engineers GmbH

During the design process the client and BW-Engineers BIM group held a “BIM open house” workshop to enable the Ministry to use the digital asset data for procurement, tender, and facility management across its portfolio of properties. The wider project team included ISO panel members that developed the ISO DIN 19650, enabling a high compliance with the information life cycle of construction projects. If applied holistically, BIM sets the framework with a common data environment “CDE” for an information management supporting production processes and quality control. For each project the standards are detailed in the BIM Execution Plan (“BEP”), helping the team members to cooperate effectively.

As with the health centre project, BW-Engineers seeks in all its projects to combine German know-how with regional methods of construction such as prototyping and high ambitions in latest technology. A further project with the Ministry of Health is a forensic centre with laboratories, where the team introduces open plan laboratories with indirect daylighting behind a tensile shading system to create an iconic identity.



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