Arab-German Yearbook 2012

Construction and Consulting

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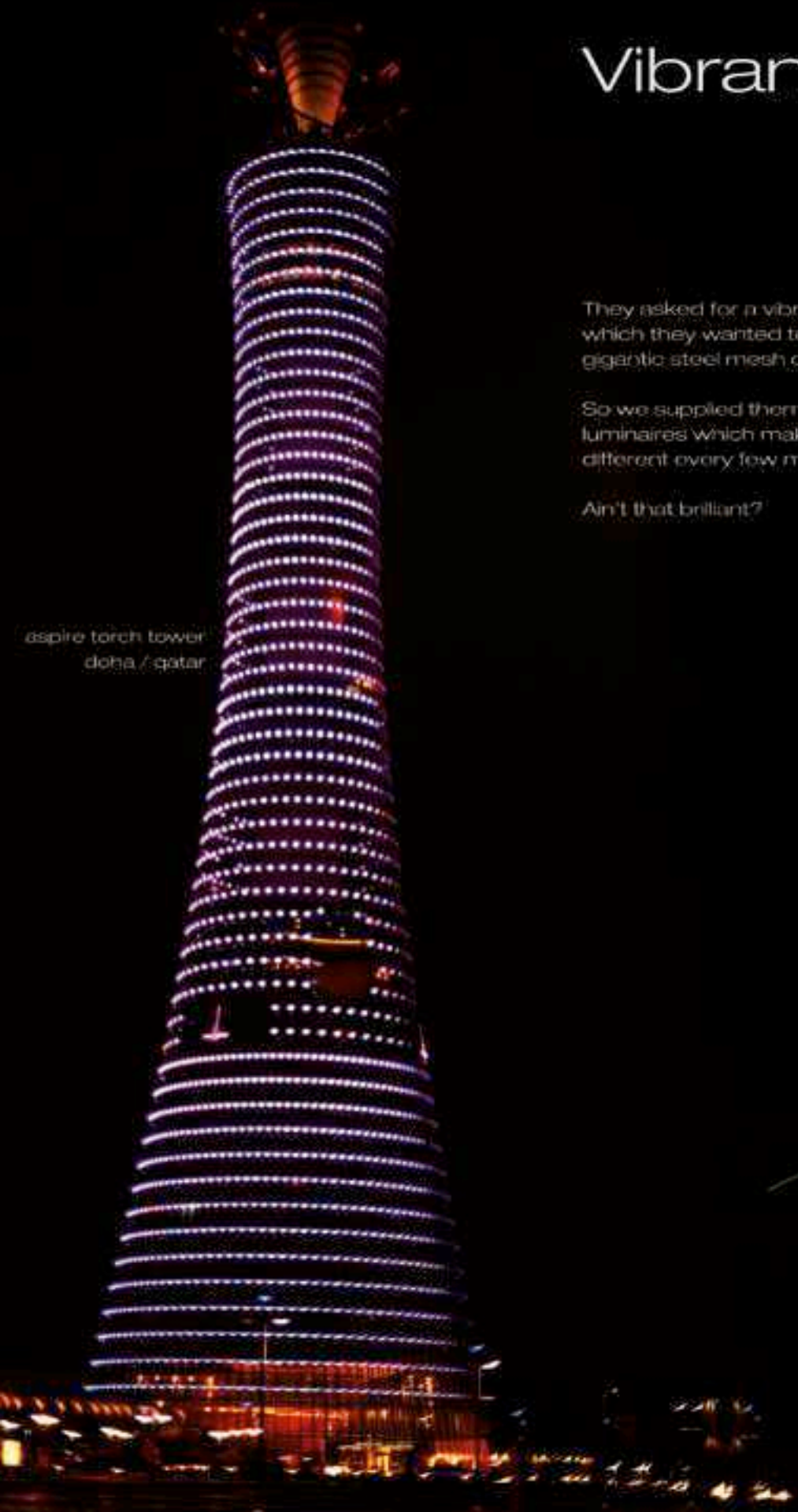
غرفة التجارة والصناعة العربية الألمانية
Ghorfa Arab-German Chamber of Commerce and Industry e.V.



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So we supplied them almost 4000 LED luminaires which make the tower look different every few moments.

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Preface

German construction and consulting companies have left their mark in the Arab world. Bridges, streets, stadiums, airports, universities, water treatment systems and lighting – a whole range of projects in the Arab world have been completed by close cooperation of Arab and German companies. This development is an encouraging sign to all of us. There is a strong and integrated trust in Arab-German business ties that helps to overcome times of uncertainties.

In its already third edition, the publication presents some of the most fascinating and promising projects of Arab and German construction and consulting cooperation, from Morocco to Oman, from Iraq to Saudi Arabia. Among these are high-profile projects that catch international attention, such as Formula 1 circuits or railway lines, but also less known but equally sophisticated projects in pumping stations and recycling systems. The projects presented in this book are therefore quite diverse but they all have one thing in common: They are proof of successful and lasting Arab-German business relations. The projects are another chapter in the success story of Arab-German cooperation.

Based on that solid ground and on huge investments of Arab countries in the infrastructure sector, there is still a great potential ahead for Arab-German business. By taking these chances, the construction industry can also make a concrete contribution not only to enhance Arab-German businesses but also to strengthen Arab-German understanding.

We would like to thank those companies who are presenting their projects in this publication. It is their work that shapes Arab-German cooperation. We would also like to thank the Ghorfa working group "construction, infrastructure and transport", chaired by Mr Olaf Hoffmann of Dorsch Consulting, for the interesting inputs and insights for this book.

Dr. Peter Ramsauer

Dr. Thomas Bach

Dr. Peter Ramsauer |
Federal Minister of Transport, Building and Urban Development

Dr. Thomas Bach |
President, Ghorfa Arab-German Chamber of Commerce and Industry

Foreword

After two successful editions we are proud to present the Arab-German Yearbook Construction and Consulting for the third time. Again, you will find ground-breaking projects of Arab-German cooperation in the construction and consulting sectors, covering all Arab countries and many different disciplines.

Abdulaziz Al-Mikhlafi

The construction boom in Arab countries is far from over. Fuelled by high revenues from producing and exporting oil and gas, many Arab countries are massively investing in their infrastructure. This creates fascinating opportunities for German companies to provide their unique and globally renowned experience and know-how. Be it from the planning and implementation of whole cities, as Dorsch aims in Baghdad, to small niche, yet indispensable services and products – Made in Germany is a strong label on Arab construction sites.

Furthermore, this book sheds some light on the variety of Arab-German projects reaching from railway tracks, shopping malls, bridges, towers to wastewater facilities or Landscape Architecture. This new edition features a special focus on lighting systems. Not always appreciated, light plays an immensely important role in our urban life of the 21st century. Good lighting increases comfort, it is illuminating skylines or gives orientation on the street level. It is also a factor of successful marketing and presentation of cities and when it comes to retail, of products. Finally, this book also aims at giving you at hand the most important facts on construction laws as well as an overview on the construction and consulting sector in Arab countries in general.

Olaf Hoffmann

At Ghorfa, German companies active in the field of construction and consulting and eager to improve and deepen Arab-German cooperation in this field have gathered in the Working Group "Infrastructure, Construction and Transport". This working group meets regularly in Germany and the Arab world and its member companies exchange their views and experiences, share information about projects and thereby successfully promote Arab-German business relations. We invite you to join us!

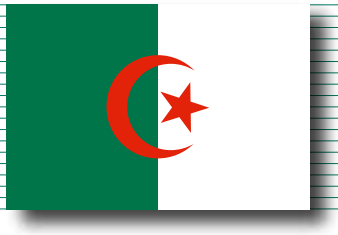
We sincerely thank Ms Rafaela Aguilera Alvarez for her commitment and dedication for the publication and all matters of the working group. We also would like to thank Ms Traudl Kupfer, Ms Birgit Tümmers and Mr Clemens Recker for their work and effort to realize this book project.

We hope you enjoy reading this book and wish you many new and fascinating insights, ideas for your own projects and inspirations for further reference projects in Arab-German business relations.

Abdulaziz Al-Mikhlafi |
Secretary General Ghorfa

Olaf Hoffmann |
CEO and President Dorsch Holding GmbH

Algeria



Country Name:	People's Democratic Republic of Algeria
Population:	34,994,937 (July 2011 est.)
Land Area:	2,381,741 km^2
Language:	Arabic (official), French (widely spoken)
Currency:	Algerian Dinar (AD), 1 AD = 100 centimes
Capital:	Algiers

Visualisation Boughzoul Station

The New Railway Line on the High Plateau of the Atlas Mountains

Obermeyer Planen + Beraten GmbH

At present the only well-functioning railway infrastructure in Algeria is in the region close to the coast. To connect the regions further south to this transport system, Algeria has decided to develop the railway line on the high plateau of the Atlas mountains in a west-east direction by 2016 and thus link them to the coastal region. The commission for the design of this railway infrastructure was awarded to Obermeyer as lead firm in joint venture with the Austrian consultancy Bernard on the basis of an international tender in 2006.

In detail, the project involves the overall planning of a railway line over a length of about 620 km including the surveying, the entire geological reconnaissance and the environmental assessment. The operating concept, the signalling and telecommunication as well as the station buildings including the adjustment of all crossing roads and tracks are also part of the scope of work. The specified design period, from the investigation of the alignment through the engineering design to the invitation to tender, amounts to about three years.

Definition of tasks

The task was to connect the towns Saida-Tiaret-Ain Oussera-M'Sila located on the high plateau by means of a new railway running in a west-east direction and to link them to the existing railway network in the coastal region by means of the construction of another new line from Tiaret to Relizane.

The new lines are to be designed for passenger and freight transport, initially single-track and not electrified, with the option of subsequent track doubling. The design speed is 160 km/h, at first it is planned to operate the line with existing diesel trains at a speed of 120 km/h. The permissible longitudinal gradient is limited to 16 ‰.

The topography is very varied. Between Relizane and Tiaret, for example, the climb up to the high plateau, equivalent to a difference in altitude of more than 1,000 m, has to be accomplished on a track with an almost 110 km rising gradient. The 230 km long western line section on the high plateau of the Atlas mountains between Saida-Tiaret-Tissemsilt is characterised by very undulating terrain, while the 280 km long eastern section Tissemsilt-Boughezoul-M'Sila runs through predominantly level terrain, albeit interspersed with wetlands and dry river beds.

Basis of planning and methodological approach

The initial route alignment was carried out using ASTER satellite data and digital SRTM (Shuttle Radar Topography Mission) terrain models with a ground resolution of 15 × 15 m and 90 × 90 m. The data volume roughly corresponds to an area of 15,000 km^2. With the aid of these satellite data, in combination with topographic maps at scale 1:50,000, an investigation and assessment of variants was performed. To evaluate conflicts and problem areas in the interests of a further optimisation of the route, the terrain of the preferred line variants was inspected on foot.

The alignment was prepared using the ProVI planning software that Obermeyer develops and markets. Consequently, it was possible to administer large amounts of data from the satellite images and aerial surveys and to employ these in the alignment.

Finally, it was necessary to refine the terrain data along the preferred line variant. A special firm was entrusted with the satellite overflying in order to obtain high-resolution IKONOS satellite images along a 5,000 m wide corridor. The data acquired in this way were employed to prepare the chosen preferred variant as an extended preliminary design at scale 1:5,000 and to recommend same for approval.

By adjusting the survey data, which were oriented towards the planning scales required for the individual design stages, it was possible to effect a reliable assessment of variants in order to ascertain the optimum route for the remit. The investigation of the alignment was performed in consideration of ecological and topographic aspects as well as the need to connect important towns.

Assessment of variants and technical planning

In the scope of the stakeholder consultation process, the assessment of the variants, including the various route recommendations, was presented to the decision-makers in the individual rural districts and municipalities and discussed. In this way it was possible to take account of the requirements of the affected regions in the planning.

Using helicopters, the approved route alignment was surveyed by means of airborne laser scanning (1 elevation per m^2). At the same time ortho-photos were taken with a ground resolution of 25 × 25 cm. The recorded corridor width was 1,500 m. The vertical and horizontal accuracy of the data was 5 to 10 cm.

On the basis of the laser survey, which was further refined by means of terrestrial survey points, the planning was developed at scale 1:1000, leading to the final design stage.

The encountered terrain and vegetation formations ranged from the mountainous region (coastal connection up to high plateau) through wetlands and dry river beds with high water levels in the rainy season to high-use agricultural areas and extensive steppes.

In preparation for the technical planning, a comprehensive drilling program was carried out for the entire line and soil explorations were used to elaborate a soils report. This opened the way for further planning.

The entire alignment and track planning was performed in a location plan at scale 1 : 1000. Longitudinal sections were prepared at scale 1 : 1000/100 (10-fold superelevation) for the whole line. Cross sections (scale 1 : 100) were created every 25 m for the entire alignment, depicting all the technical fixtures

Line overview

Existing buildings at Saida Station

View at the platforms, visualisation Boughzoul Station

required. In this way it was possible to determine all the excavation and fill quantities with a high degree of accuracy.

The drainage of the entire line was also planned as part of the technical route alignment, including the discharge of water quantities in the recipient or percolation basins.

Single-line operation was initially envisaged for the planned railway. This necessitated the integration of overtaking stations along the route.

To accommodate the option of a subsequent double-track extension, all engineering structures such as tunnels, railway bridges, viaducts and crossing road overpasses were already dimensioned for double-track railway operation. For the tender planning, all engineering structures were prepared according to the European standard.

For reasons of economy, the proportion of railway tunnels was kept to the technically acceptable minimum wherever possible. In the mountainous region this led to a very sinuous alignment with minimum radii of up to R = 1,000 m. As a result, however, it was possible to limit the proportion of tunnels to a total of 3.5 km, adhering to the design speed and the permissible longitudinal gradient.

Complete station facilities, including the traffic infrastructure and required station buildings and maintenance facilities, were planned at the passenger railway stations. Visualisations were employed when presenting the station buildings to the decision-makers. The signalling equipment, the telecommunication and the 50 Hz installations were planned for the entire line including the station and interconnection areas.

The key data of the overall project may be summarised as follows:

- 151 railway bridges
- 173 road bridges
- 21 stations including overtaking stations
- 5 tunnels
- 70 km re-design of roads
- approx. 67 million m^3 earth moving
- 1,100 km^2 laser scanning
- A total of approximately 4,000 drawings were prepared at a variety of scales.

Status and outlook

In the near future, the aforementioned designs will give rise to this major extension of Algeria's railway infrastructure. The overall project was put out to tender in three lots. The contractors have been hired; the first construction activities are underway. The works are due to be finished by 2015/2016.

With the completion of this railway infrastructure scheme, the journey by train will be faster and more comfortable for the population than by car. Compared to travelling by car, the time it takes for passenger transport on the high plateau between the towns of Saida and M'Sila will be nearly halved.

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