MAN news

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IN FOCUS

Malls & Shopping Centers

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From a local company, to a leader

JOE KIRIAKOS

I knew MAN Enterprise well prior to joining the company in 2003. I saw it grow from a local company to a leader in Lebanon. It is now one of the most well-known names in the construction field in the Middle East.

MAN Enterprise had a vision and everybody committed to it with enthusiasm. We were always one step ahead, seeking to position MAN Enterprise among the industry front-runners, and invested in turning the small company into a large corporation.

My journey started on-site at Habtoorland as the Electrical Project Manager. The project was a fast track project (as most of our projects are) where activities had to be closely coordinated with the rides which were long lead items. It was not traditional in the sense it involved all aspects of electrification works, and the MEP external infrastructure part which was the most challenging.

Three years later, after having executed a couple of projects, I moved to the Head Office. At first it was like school for me where I learned the business on a hands-on basis. I was later assigned as the head of the electro-mechanical division which later turned into a stand-alone company, Metrix.

Metrix was established then, and along with another sister company Tecman Industry, the expansion started. MAN Enterprise grew into a corporation as did my experience with time. Our Chairman entrusted us to manage the Metrix portfolio, and the aim was diversification within the business.

At that time, business in Qatar was growing rapidly and no serious electro-mechanical subcontractors were available to meet the needs of the fast paced projects. However, Metrix succeeded in all challenges which contributed greatly to the group's success. The same applied to our operations in Libya, Sudan, and Iraq.

Metrix now holds certifications in ISO 9001, ISO 14001 and OHSAS 18001, as well as Kahrama Grade A and Civil Defense Grade A.

Our engineers are also Grade A certified from Kahrama and the Civil Defense in Qatar. Furthermore, our experienced staff members are also accredited with specialties such as Tier Designers, Data Specialists, Low Current Specialists, and Network Infrastructure Specialists.

Metrix is now exploring new business in the electro-mechanical field and seeking new opportunities with international contractors in Qatar and other markets. Seneca once said, "Luck is what happens when preparation meets opportunity." Although we believe that one can never be too prepared, we hope to be prepared enough.

MAN Enterprise went through good and bad days. We cherished the good ones, survived and learned from the bad ones and kept moving with more determination. Through these grim times I always had faith in MAN Enterprise; we learned to manage as we did before.

I am proud to be part of this group where I have not only colleagues, but family.

Joe Kiriakos
MEP Manager

Handed Over Projects

DAMAC TOWER
BEIRUT, LEBANON

General Contractor:
MAN Enterprise Lebanon

The architectural award winning Damac Tower is located in the sea-front towers area of the Beirut Central District providing luxury, high quality, and aesthetic living through a unique partnership with world renowned Italian designer Versace Home. The tower consists of four basement floors, a ground floor, and 28 upper floors with an overall built up area of approximately 50,000 m^2, an underground footprint of 2,600 m^2 and a superstructure footprint of 1,650 m^2. MAN Enterprise's scope of work is comprised of structural, architectural, electromechanical and internal finishing works.

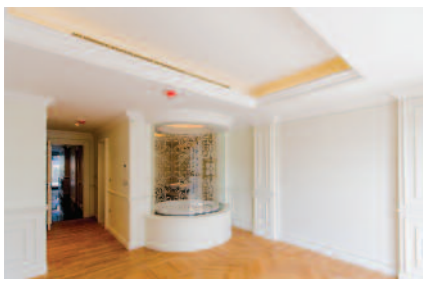
The development includes 183 luxury apartments, ranging from studios and one-bedrooms to four-bedroom apartments. In addition to a retail area and a common section including health and fitness facilities. This challenging project has been handed over while meeting very stringent time and quality requirements of DAMAC Properties and the renowned Italian designer Versace Home.

In addition to the internal finishing achievements, the complex and one of a kind façade has been handed over after meeting the rigorous requirements of Valode et Pistres façade architects. They conceived a façade made of non-identical curved balustrade glass panels forming curved shapes representing the perpetual movement of the sea.

Tecman Industry's scope of work:

Tecman Industry's large and delicate scope of work on this project consisted of all interior woodworks in apartments and common areas which included all wall panels, fluted columns, headboards, mirrors, doors, kitchens, wardrobes, and bookshelves in addition to the parquet flooring in the common facilities area and all 325 bedrooms.

Tecman Industry's scope also encompassed the external steel support structure of the aluminum louvers along all the east elevation of the building.



Handed Over Projects

MULTI-STOREY PARKING STRUCTURE
ABU DHABI, UAE

General Contractor:
MAN Enterprise Abu Dhabi

This multi-storey parking structure in Abu Dhabi consists of three underground floors with a roof parking of 813 spaces and associated improvements to the public realm, surface parking and existing sector roads and utilities. It also includes a one storey temporary steel structure car park accounting for 689 car spaces which was designed and built on an adjacent plot prior to the construction of the underground car park.

Phase 1: Temporary Parking

The Temporary Car Park project was designed and executed before launching the Permanent Underground parking to compensate any car parking loss during its construction

The occupied area by the building on ground floor level is 7,808 m^2.

The system consists of a main modular steel structure, on which lay precast composite slabs.

The main structure consists in metallic circular section columns and IPE beams which are connected together by bolted embedded connections. The concrete slabs are pre-assembled, concreted in the ground and then raised to the final position. The slabs are modulated with sizes compatible with the frames of the steel structure.

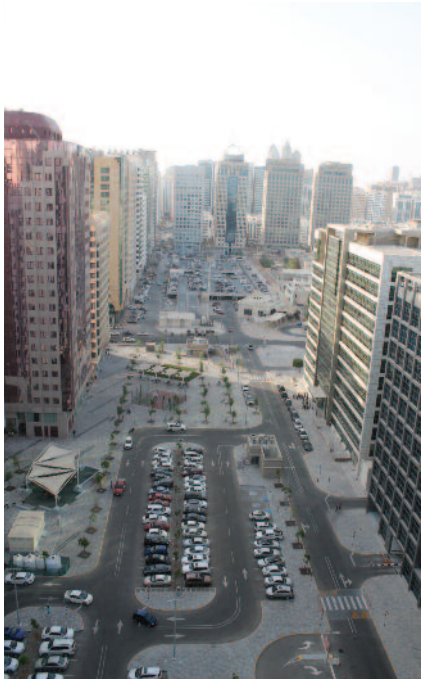
The entire structure and other building elements are designed to be potentially disassembled later and reassembled at another location if needed, using the same materials, exception made for the water-proofing joints.

Phase 2: Multi-Storey Underground Car Parking

A Multi-Story parking structure of 813 parking spaces distributed over three underground floors and with a total Built-up area of 22,200 m^2.

The works comprised of the following site development:

- Earthwork
- Relocation of existing utilities
- Shoring Works (secant pile)
- Piling works
- Raft foundation works
- Sub base and base courses
- Asphalt works
- Cast in situ concreting work
- Pre stressed concrete works
- MEP Systems
- Traffic monitoring and control system
- Roof area development works which will include landscaping works, kids play ground, basketball court, EPDM playground etc.



Ongoing Projects

COMMERCIAL BUILDING (B+G+P7+13F) on plot no. Marina – Mix 052

LUSAIL, QATAR

This project in Lusail consists of the turnkey construction of the office tower comprised of a basement, ground floor, seven upper floors serving as parking spaces, and 13 floors of office space.

Concrete works/slabs have been completed except for minor concrete framing walls, columns and beams at the roof level to support the structural steel roof truss.

Electro-mechanical first fix works are completed, second fix works such as firefighting pipe works, water supply & drainage works, duct works, cables pulling for all systems, cable trays and the like are in progress, similarly to block works at the 16th floor and upwards. Plaster works and sub-frames for wooden doors from the 12th floor and below are completed whereas the above are still in progress.

HOLIDAY INN
DOHA, QATAR

Located in the business park, the Holiday Inn Hotel is a four star hotel consisting of 307 rooms with amenities, a ballroom, restaurants, and a swimming pool and support areas with an approximate built-up area of 35,000m^2. MAN Enterprise's scope includes the turnkey construction: enabling, civil, structural, architectural, FF&E and electro-mechanical works.

The structural works are in the final stage. The architectural works are proceeding simultaneously. Electro-mechanical works are also in progress, such as a fire-fighting network, drainage network, ducting works, insulation, cable trays and trunking.

Ongoing Projects

SAGESSE UNIVERSITY - Polytech & Health Faculty

BEIRUT, LEBANON

The project consists of building two faculties, 'Polytech' and 'Health', with a 13,200m^2 of built-up area, distributed on two underground floors (parking and technical rooms), a ground floor (lobby and auditorium), and five upper floors (administrative, laboratories, and classes). It is an extension to the existing Sagesse St. Paul University.

The total Built-up area is 11,000m^2 on a 1,800m^2 plot and consists of two basements for parking and technical rooms and six floors for classes, laboratories and documentation rooms. The ground floor comprises of the marble-tiled main lobby, cafeteria, Amphitheatre, offices and physiotherapy rooms. The façade is stone and aluminum cladded, and internal finishes include marble, ceramic, Vinyl, wood and aluminum.

Concrete and block work activities are completed. Electro-mechanical and finishing works are in progress. The project completion date is August 2016, on which this facility shall be a remarkable addition to the education sector in Beirut.

MEET THE TEAM

Beshoy Saad

SENIOR ARCHITECT

MAN Enterprise Qatar

In 2008, I joined MAN Enterprise Qatar. I was first assigned as an architect in Porto Arabia, a prestigious project on Pearl Island. In 2009, I joined the QNCC Project, a car park with high end finishes and a special external façade, the first of its kind in Qatar.

After QNCC, I joined the WAAB Mall Project, and from there the Lusail Tower Project in 2010 where I was the head of the Architectural Department. The project was successfully completed on time.

In 2012, I handled the Intercontinental Car Park which had stringent time limitations. This was also completed on time and we achieved our target.

I joined the West Side Car Park Project in 2013, which consisted of two metro stations and a 3,000 space parking. Through extensive coordination between our team and different sub-contractors, it was handed over.

I am currently working on the Holiday Inn Hotel Project as a technical coordinator managing a team of four architects.

Construction work, similar to sports teams, must be done collectively in order to achieve goals with the required quality and time limit for the successful delivery of the projects. Furthermore, every day in the construction field MAN Enterprise introduces new experiences that benefit me personally, not only career wise, but also socially.

Camille Henaine

CORPORATE CHIEF ACCOUNTANT

MAN Enterprise Corporate

Back in 1999, MAN Enterprise was a growing company as it had just finished one of its largest projects, Le Royal Hotel. Afterwards, the company set its sights on two other major projects, the Metropolitan Palace Hotel and the Movenpick Hotel. That is when I joined the MAN team.

Starting as a junior accountant in the head office, I worked with exceptional people. The people were hard workers who had strong team spirit.

Subsequently, I was assigned to the Metropolitan Palace Hotel as a site accountant. Working at this site showed me that the company encouraged that same positive spirit that was found at all levels of the company, which was and still is a requirement of the management.

Site work gave me the opportunity to meet and collaborate with all kinds of people and be exposed to a broader range of experiences throughout the entire life span of projects. I took all of the new information I had gathered to the head office where I returned and rejoined the growing team of the Accounting Department.

The company grew and continued to take on new projects, both locally and internationally.

Throughout the years, I was promoted from one position to another until reaching my current position of Corporate Chief Accountant. Now, as before, it remains our task and duty to disseminate necessary information to the new members of the Accounting Department and to strengthen and enhance our work methods within the company for the greater good of us all.

Roy Malkoun

SENIOR COST CONTROLLER

MAN Enterprise Lebanon

I joined MAN Enterprise in 2003 as a quantity surveyor on the City Mall project. I was responsible for taking off quantities for all activities on site starting from concrete to all finishing works. I had large responsibilities as the project was based on a re-measured contract.

In January of 2006, I was assigned to the Dora Viaduct Project. It was a new challenge for me as I endorsed new types of activities I never had dealt with before such as the deviation of roads to earth works, asphalt works, structural and bridges works, incidental and street lighting construction, and landscaping works.

In December of 2008, I was assigned to the I. Sursok Residences Project which consisted of 25 floor tower building located in an upscale area in Ashrafieh. I was responsible for all on site controls including quantity take off, payments, material submittals, letters, variation orders, claims and cost control. It was a push forward in my career as I was involved in every step of the project.

Furthermore, I was assigned to the Sky Gate Project in May of 2011. This project consisted of 42-floor tower building on the highest hill in Ashrafieh / Beirut. It was a new challenge for me to deal with 66 high end finished apartments. I dealt with all related monetary aspects of the project from payments to variation orders and cost control.

After more than 12 years with MAN Enterprise, I can now call MAN Enterprise my second family and home as it has contributed to enhancing my professional career and taught me all that is required to become a leader in this domain.

CASE STUDY

Mudeirej Bridge

The Mudeirej Bridge is the highest overpass in the Middle East. It is located in Hammana and constitutes a vital link between Mount Lebanon and the Bekaa Valley. Unfortunately, during the summer war of 2006, the bridge was severely damaged by the bombardment (especially the southern section).

BRIDGE STATUS BEFORE REHABILITATION

BRIDGE STATUS AFTER REHABILITATION

MAN Enterprise accepted the challenge of participating in the reconstruction works of the Mudeirej Bridge, in particular the demolition works and the reconstruction of the damaged foundation and vertical structures. MAN Enterprise exceeded expectations with the project, and a new achievement was added to its outstanding record in the construction industry.

Several special construction techniques were implemented during the reconstruction works such as:

COLD WEATHER CONCRETING:

Cold weather concreting is the process in which concrete works must be carried out during cold and freezing weather conditions. Specifications of the Mudeirej Bridge stated that cold weather concreting should be considered when the air temperature is below two degrees Celsius (2º C).

Pouring and casting concrete required special techniques and methods to prevent damage to the concrete due to early freezing. We had to insure that the concrete developed the required strength for sage removal of forms, maintained curing conditions that yielded normal strength, and limited rapid temperature changes before the concrete reached sufficient strength.

The applied method for cold weather concreting for the Mudeirej Bridge Restoration Project consisted of:

- Removal of snow, ice, and frost from all spaces intended to fill with concrete using hot-air or basic mechanical methods.
- Insulation of formwork in order to prevent early-age freezing by covering / insulating newly poured concrete by tightly wrapping the insulating miothane blanket (geofrost) around the formwork and the hollow section of the pier to ensure that the temperature of the concrete does not drop below 10º C.
- Maintaining concrete and frequently checking the temperature to make sure it is within the acceptable margins.
- Stripping of forms after the concrete has reached the required strength, should be carried out slowly and carefully to ensure the corners stay intact and crack-free.

IMPLOSION: IMPLANTATION OF EXPLOSIVES WITHIN A HEAVY DAMAGED PIER

- Protection of the concrete after stripping the relevant forms with insulating blanket to maintain concrete temperature by tightly wrapping the blankets around the concrete section and being fixed in place by heavy duty ropes and plastic straps. This insulation process should remain for a period of 7 days after the concrete has been placed for the subject element.

IMPLOSION: EXPLOSIVES SET AND PROTECTED AT DESIGNATED LOCATIONS OF THE BRIDGE

IMPLOSION:

After a detailed study, the decision to partially demolish the south part of the bridge was taken due to the unrepairable damage.

Since it was crucial not to cause any physical damage to the northern part of the bridge and the remaining areas of the southern part in the demolition process, and as time was a major concern in the restoration process due to the huge importance of the bridge, the most convenient method chosen for demolition was implosion.

Implosion is a controlled demolition method performed by strategically placing explosives on critical supports of any given structure and distantly detonating it in a way so that the structure can no longer withstand the force of gravity.

Many critical studies and surveys were performed, including but not limited to: structural studies, load, primary structural motion, load ratios (which conclude the amount of explosives needed for every cubic meter of reinforced concrete), predicting drop and debris areas, and the key location of which the explosives should be placed.

Once all the studies were performed, the following steps took place: pre-weakening of the structure, drilling holes with the appropriate dimensions into the key areas, placing explosive charges, making necessary connections, and wrapping the targeted piers with a geotextile fabric and close-mesh metal fence.

IMPLOSION: SETTING OUT THE DETERIORATION DEVICE

FRP (FIBER REINFORCEMENT POLYMER):

The fiber wrapping (FRP System) technique was applied to repair some of the damaged piers. The methodology of work related to this repair system can be summarized as follows:

Preparatory Works:

- The concrete surface of the pier was sandblasted to remove the paint and all damaged areas were chipped to eliminate unsound concrete and loose particles.
- The cracks were injected and the walls were filled with the relevant marban and grout.
- A surface preparation was conducted in order to remove protrusions, sharp corners, irregularities, laitance and/or dust from the concrete surface.

Application Works:

- A surface primer was applied on the pier surface which received the FRP fabric.
- A sufficient workable quantity of resin was applied on the FRP fabric and spread evenly until the reinforcement was fully covered and saturated thoroughly with resin. Subsequently, the fabric was fixed by using a roller.
- The same procedure was applied for the installation of the consequent FRP layer(s). The number of FRP layers to be applied at the various levels of the pier was determined by the study / calculations of the specialist.
- The final FRP layer was protected by a protective coating.

Walid Khalife
Contract Manager

NB: The FRP works should be supervised by persons certified by the FRP manufacturer. In addition, the FRP system cannot be applied in rainy or snowy conditions or if the ambient temperature is below 4°C.

FRP: APPLICATION OF THE FRP

Malls & Shopping Centers

The fully enclosed shopping mall did not appear until the mid-1950s. The idea of a regionally-sized, fully enclosed shopping complex was pioneered in 1956 by the Austrian-born architect and American immigrant Victor Gruen. This new generation of regional-size shopping centers began with the Gruen-designed Southdale Center, which opened in the Twin Cities suburb of Edina, Minnesota, USA in October 1956. For pioneering the soon-to-be enormously popular mall concept in this form, Gruen has been called the "most influential architect of the twentieth century".

The mall retail space and the retail real estate are expected to increase in the next few years. New mall operators are under planning and construction since mall customers are already making up two thirds of all shoppers in the MENA region. The rising activities in this retail sector is pushing up competition, and putting retailers under pressure to upgrade their services and price offers, pushing out by that the low performers. Entertainment such as movie theaters has become an essential component of success for malls. The expansion will help bring in more tourists, one common thread many travelers worldwide share is the penchant for shopping - a demand which hoteliers, particularly those in the Middle East and Asia, are happy to oblige by connecting new hotel developments to retail outlets and malls.

ABC SHOPPING CENTER
ASHRAFIEH, LEBANON

Client: Fadel Real Estate Co.
Consultant: A Consult
Start Date: January 2001
Duration: 29 months

Description: This luxury shopping center in Ashrafieh is a 120,000m² development on a 20,000m² plot, comprising retail areas, cinemas, restaurants, and a multi-storey parking to accommodate 1,300 cars. MAN Enterprise's scope of work was the execution of the civil works.

ABC Shopping Center Challenges:

The enabling works had already started, and MAN Enterprise needed to mobilize quickly to start the structural works by December 2000.

Several challenges presented themselves in this project:

- Coordination with traffic: As the project was surrounded by busy commercial streets and schools, traffic was a major challenge. The concrete casting operations and material deliveries had to be well coordinated with the municipality and traffic police to minimize the impact on traffic flow.
- Restricted working hours due to neighboring residential areas imposed another constraint as the concrete casting had to be started and completed during a day shift to avoid disturbances to neighbors.
- The structural works on different sections had to be completed in a timely manner to enable other contractors to proceed with their works in accordance with the master program to avoid delays.

CITY MALL DORA
BEIRUT, LEBANON

Client: Admic sal
Consultant: D & H Engineering
Start Date: June 2003
Duration: 21 months

Description: City Mall is the largest mall in Lebanon with a built-up area of 220,000 m^2. The mall is comprised of five floors of retail shops, two basements serving as parking and technical rooms, a hypermarket, cinemas, food courts and entertainment.

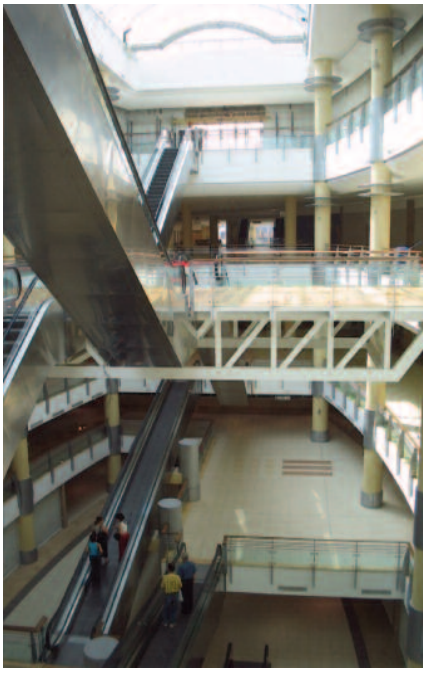
City Mall Challenges:

The main challenge of the City Mall Project was the sheer size of the project and its tight schedule. Some 210,000m^2 development over four floors had to be completed according to several deadlines, in less than two years, including enabling works, testing, and commissioning.

Starting in May 2003, the first deadline was set for early December 2004 to allow for the opening of the Geant Hypermarket ahead of opening the mall itself which was due six months later.

The challenges in the City Mall were exceptional:

- MAN Enterprise utilized 17 tower cranes in total and at peak, the workforce exceeded 1,200 labor and technicians.
- Site logistics were planned to allow day and night shifts in order to meet the tight schedule. Human resources were distributed accordingly.
- Hollow core slabs and precast slabs were used on a large scale to enable fast concrete casting.
- An on-site concrete batch plant was installed to allow for concrete casting over day and night shifts, as no work hour restrictions applied in this area.
- Design drawings were developed on-site by the client, issued and coordinated by the team on a timely basis in order to avoid work interruption.
- Long lead items had to be procured and delivered very early in the project to permit timely installation.
- Multiple subcontractors who were not accustomed to large scale and fast track projects needed to be managed.



ABC VERDUN
VERDUN, LEBANON

Client: Verdun Mall S.A.L.
Consultant: Khatib & Alami
Start Date: January 2015
Duration: 29 months

Description: The shopping mall includes retail units of different sizes, the multi-level ABC Department Store, movie theaters at the top level with hosting screens, entertainment areas encompassed within a food and beverage zone, and outdoor seating areas.

ABC Verdun Challenges:

ABC Verdun Project is a shopping mall in the center of one of the busiest neighborhoods of Verdun area - Beirut, surrounded by residential and commercial buildings from all sides.

The substructure consists of six basements mainly composed of underground parking and service areas. The superstructure includes the retail / shopping center, cinemas and restaurants. On top of the structure lay four large and heavy canopies made from steel and glass. MAN Enterprise's scope includes all Civil, Architectural and Electromechanical Works on a "Core and Shell" basis for a total built-up area of around 150,000 m^2.

The challenges of this project commenced prior to the first day of construction. In fact and despite the difficulty and magnitude of the project, we agreed to reduce the duration of the project from 30 months to 870 days (~1.5 months less)!

While we were expected to hit the ground running, it was quite a challenge to figure out how to access and mobilize the confined and fully excavated site area. Where to place the offices? How to erect the tower cranes? By what means to insert a mobile crane, mobile pump and excavators within the already-excavated and inaccessible site? Standing under the heavy rains of January, the team was baffled as to how to park the heaviest mobile crane in Lebanon on the fragile roads and shoring system to deliver the heavy machinery to the site. In addition, coordinating logistics with the local authorities was and still is a headache in itself on the busy and narrow streets of Verdun.

While searching for innovative solutions to the above dilemmas, MAN Enterprise was faced with more challenges of not being able to hire enough labors to properly launch the construction of the tight-scheduled project. The neighboring war and the stringent new Regulations of the General Security with respect to Syrian Labors did not make this task any easier. The resources required to construct a flat project with a footprint area of 18,000 m^2 were nowhere near sufficient and available at hand. Accordingly MAN Enterprise's team, with the assistance of several competent Structural Designers, sought to substitute as much as possible the huge volume of cast in situ concrete slabs / beams by precast concrete elements in order to minimize the human resources involvement on site. Although such approach would entail additional Risks and Liabilities on MAN Enterprise, but this was the optimal solution to overcome the workmanship problem.

On the other hand, the aforementioned solution launched two new challenges

for MAN Enterprise staff; the first one is to complete the re-design at a fast-enough pace in order not to hinder the progress of works on site, and the second is to coordinate the schedule and logistics of the resulted large number of delivery trucks and the limited number of Tower Cranes.

Even though we have constructed around 65% of the Structure, we can't yet say that the challenges are behind us. Coming up is a challenge to oversee all the Contractors' of the 300 tenants as they begin to prepare their shops. We will need to find a way to manage them as we also carry on with our internal finishes, the façade, the installation of heavy machinery and equipment and the installation of the four overarching canopies on top of the mall.

THE GATE
DOHA, QATAR

Client: Salam Bounian Development
Start Date: June 2007
Duration: 36 months

Description: The Gate is comprised of three 16 storey commercial towers, underground parking, and retail outlets on three levels. The total built-up area is approximately 95,000 m^2. MAN Enterprise's scope of work includes the architectural, structural, internal finishes and electro-mechanical works.

The Gate Challenges:

The Gate, a shopping center and commercial office complex in the heart of Doha, was built by MAN Enterprise. The project consists of three basement levels, lying 15 meters below the water table level with a footprint of 16,000m^2, a podium of three levels with a foot print of 12,000m^2, and three towers with a footprint of 1,200m^2 each. Towers A and B are connected with a steel structure on the 15th floor (60m above ground) to form a 4,000m^2 floor area.

The podium was to be built as an extension of the existing shopping center, the Salam. This meant that construction had to have minimal disruption on the normal operations of the shopping center. Completing a section of the parking in a three month period constituted the biggest challenge.

During the construction of the Gate Project, these challenges were encountered as is the case in most projects. The impact of such challenges was well contained as the project management team was prepared for such challenges via well-thought out contingency plans. Certain challenges highlighted below had had a particular impact on the Gate Project.

Construction of the Gate Bridge

The Challenge:
The challenge was to connect 2 towers at levels 14, 15, 16 and the roof. The towers are in reinforced concrete structures while the bridge is in steel structure with a span exceeding 30 m.

The Methodology:
The Consultant proposed a design consisting of beams at each level hanging on a truss erected at the highest level. The idea was brilliant but the execution almost impossible since it implied to erect the truss from top to bottom unless using huge mobile cranes that cannot be accommodated within the surrounding area of the project (Figure 1). Man Enterprise proposed an alternative where the erection would be executed from below to top using existing tower cranes. This method imposed additional insert plates on the concrete columns to install temporary

bracing that shall support the structure during erection until reaching the final stage.

Prior to proceed with the implementation of the steel structure, we had to design the hangers and the insert plates and verify that the concrete structure would withstand the lateral forces introduced by the new elements (Figure 2). Once the aforementioned elements were designed and verified by an independent engineering firm, then approved by the consultant, the method statement was developed along with schematic illustration of the proposed sequence of erection.

The steel structure members were lifted in a predefined sequence depending on their locations by different tower cranes. In order to reduce the number of fixing or connection when working at height we proceeded partially with the assembly of trusses one by one on the ground taking in consideration the capacity of tower cranes..

FIGURE 2: BEAMS OF 14TH FLOOR WITH BRACINGS

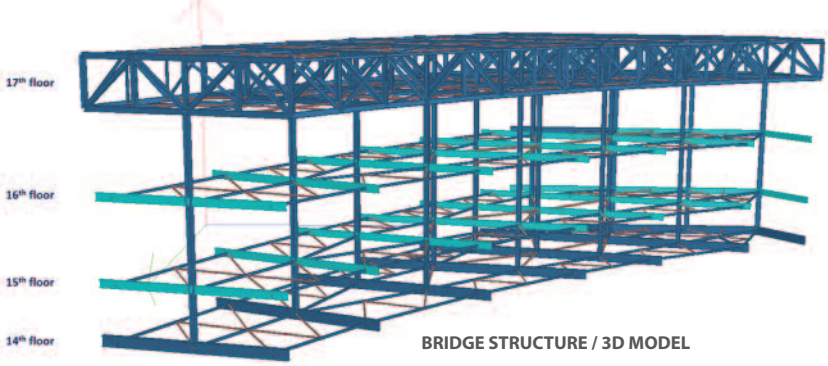
Execution:

14th floor beams were installed one by one including temporary hangers as cantilever to concrete columns at both sides of the bridge, and then we proceeded with the fixing of intermediate beams to connect with the previously installed elements. Once main beams were installed, we proceeded with the erection of lateral beams in order to install the metal decking to slabs. 15th floor beams were installed following same sequence of 14th floor beams (Figure 3).

Beams of 16th and 17th floors were erected without temporary hangers; because once the beams of the 14th and 15th floors were completed they were considered as a truss that could hold the weight of 16th and 17th floor beams awaiting the completion of the 17th floor trusses which would hold all columns and subsequently all steel beams.

Once all steel members at roof were fixed and joined together and tightened to reach specified torque, the temporary

hangers at 14th and 15th floor were progressively removed, after proving by a calculation note that the dynamic load upon releasing the hangers will not affect the structure of the building.



BRIDGE STRUCTURE / 3D MODEL

Safety:

It remains to mention that all activities and erection of steel members were executed in accordance with the safety requirement. A safety net was fixed under the beams and covered all the area to prevent falling of workers and tools, and safety wires were tied between columns to fix safety belts (Figure 1).

FIGURE4: THE GATE LINK BRIDGE AFTER COMPLETION

PORTO ARABIA
DOHA, QATAR

Client: United Development Company
Consultant: KEO International Consultants
Start Date: January 2007
Duration: 33 months

Description: Porto Arabia is a project within the Qatar Pearl consisting of retail space and townhouses extending over 14 parcels surrounding the waterfront. MAN-CAT JV executed parcels 4 to 10 which is comprised of 49,000m^2 of retail nodes and 75,750m^2 of townhouses.

The Pearl Qatar in Doha is a reclaimed island spanning nearly four million square meters.

MAN Enterprise has executed almost 125,000m^2. The project was divided into seven parcels consisting of the following:

1. Five blocks of Townhouses
2. Five blocks of Retail

ERBIL CITY CENTER
ERBIL, IRAQ

Client: Nasri Group of Companies-NGC
Consultant: Middle East Corporation for Reconstruction & Investment
Start Date: 2005
Duration: 36 months

Description: This commercial and trade center is located in Erbil city of Iraq. It represents the new downtown hub which is integrated within the old city quarters and is composed of a huge mall, shops and all related recreational and service areas. The Erbil City Center was the first mall to be built in the city.

Trainings

MAN ENTERPRISE | CORPORATE

CANDY TRAINING
OCTOBER 19 - 20, 2015
BEIRUT, LEBANON

Candy is a modern software suite focused on project estimation and control in the construction field. 15 attendees were chosen to attend the training which was held at the MAN Training Center in Sin El Fil on October 19 - 20, 2015. The training was conducted by CCS-Dubai, who provided the attendees with certificates upon completion of the training course.

MAN ENTERPRISE | LEBANON

ORIENTATION DAY
JUNE 12, 2015
BEIRUT, LEBANON

MAN Enterprise welcomed 31 students who joined the LIFE (Leading Internship Field Experience) program which is composed of a two month internship at one or more of the sites/ departments. The interns were grouped together on June 12, 2015 in order to review what they would encounter during their stay at MAN Enterprise and how they could develop their knowledge by having hands-on experience. Several reps from the Group shared their experience and achievements throughout the years with MAN Enterprise.

SAFETY INDUCTION
OCTOBER 23, 2015
BEIRUT, LEBANON

Twenty managers and supervisors from MAN Enterprise attended an induction where several HSE concerns were addressed. These concerns were related to working at heights, controlling subcontractors, the safe use of lifting equipment, cradles, scaffolding, housekeeping, temporary electrical distribution and fire hazards. The proactive approach of effective risk assessment was introduced as core processes to mitigate risk. The induction reflected the management's aim of enhancing the safety culture, sharing standard practices across the organization, and stressing the need for positive involvement of each and every employee in maintaining HSE controls on site. The induction commenced with a historical brief of the evolution of health and safety over time.

MAN ENTERPRISE | QATAR

WEBINAR ON METRO AND TUNNELING PROJECTS SCHEDULING AND CONTROL (TILOS SOFTWARE)

JUNE 9, 2015 - DOHA, QATAR

A team from MAN Enterprise Qatar attended the training that introduced TILOS as planning, monitoring and control software. The webinar demonstrated how TILOS basically for infrastructure can be used to minimize the number of repetitive activities in the schedule, optimize productivity rates, minimize the total time of crew and avoid clashes, and reduce project duration and overall cost.

WORKING AT HEIGHTS COURSE

JUNE 14, 2015 - DOHA, QATAR

Working at Heights Training aims to identify the different scenarios at which the operatives might be exposed to height on construction sites, the associated hazards, and the hierarchy of controls to prevent and protect against falls. The risk of falling is high and constitutes the number one killer in the industry. Therefore, training was given to eight members in order to equip them with necessary techniques that protect from injury and possible hazards.

REVIT

JUNE 20 - JULY 16, 2015
BEIRUT, LEBANON

A five day training was attended by 21 members from MAN Enterprise Qatar in Beirut, Lebanon. Candidates were divided into three groups: structural, architectural, and MEP. Each group reviewed the Revit Essentials Training Software which allows engineers and other building professionals to design and document a project by creating a parametric three-dimensional model. This model includes both the geometry and non-geometrical design and construction information which forms a step in Building Information Modeling (BIM).

MAN Enterprise Qatar not MEQ followed up on the training by issuing the

candidates training exercises on Revit implementation in preparation for the advanced training to follow.

EMERGENCY FIRST AID INCLUDING CPR & AED

JUNE 29, OCTOBER 17, AND OCTOBER 25, 2015 - DOHA, QATAR

During construction, operatives are exposed to risk of injury that requires immediate intervention and support. The training reviewed necessary techniques and procedures relevant to on-the-job injuries. Five participants attended the course.

SCAFFOLDING INSPECTOR

OCTOBER 7, 2015 - DOHA, QATAR

Three participants attended the course which focused on the methodology of the safe erection of scaffolding. It covered the inspection and monitoring of scaffolds through the entire building process.

FIRE MARSHALL

OCTOBER 7, 2015 - DOHA, QATAR

The course provided knowledge with regard to assessing fire risks and implementing fire controls. Moreover, it directed the six participants on how to lead their teams and take proper action during emergencies.

TECMAN INDUSTRY | LEBANON

AUTOCAD

SEPTEMBER 29, 2015 - NOVEMBER 26, 2015
DBAYEH, LEBANON

Nine craftsmen from Tecman Industry attended the AutoCAD training sessions at the ETC Computer Training Center. They learned how to use AutoCAD commands to draw doors, windows, cabinets and the like.

METRIX | QATAR

AUTODESK REVIT MEP

OCTOBER 3 - 11, 2015
DOHA, QATAR

Nine participants attended the eight day Autodesk Revit MEP training which consisted of Building Information Modeling (BIM) software created by Autodesk for professionals who engage in MEP engineering. MEP stands for mechanical, electrical, and plumbing, which are the three engineering disciplines that Revit MEP addresses. By utilizing BIM as opposed to computer-aided drafting (CAD), Revit MEP is able to leverage dynamic information in intelligent models while allowing complex building systems to be accurately designed and documented in a shorter amount of time. Each intelligent model created with Revit MEP represents an entire project and is stored in a single database file. This allows changes made in one part of the model to be automatically propagated to other parts of the model, thus enhancing the workflow for Revit MEP users.

MAN Group
Beirut Marathon 2015

MAN Enterprise, Tecman Industry and Metrix participated in the Beirut Marathon on Sunday, November 8, 2015.

The Group joined the Beirut Marathon Association to promote wellness and physical activity among its employees. The marathon provides an experience of physical and mental challenges and achievement. This year, more than 300 colleagues and their families from the MAN Group participated in running for peace. Endorsing team spirit, they had the opportunity to gather, socialize, and participate in the experience of which more than 120 crossed the finish line.

MAN Group supported the Lebanese Breast Cancer Foundation In promoting awareness for the disease.

CERTIFICATES

Qatar Civil Defense Department
MAN Enterprise Qatar

Recognition Certificates - Lusail
MAN Enterprise Qatar

Kahramaa 2016 - Metrix Qatar

SOCIAL NEWS

Weddings

| MAN Enterprise |

- Halim Hourani & Carine Saadé — June 5, 2015
- Fadi Hnein & Marie-Christine Farah — July 3, 2015
- Dany Constantine & Josiane Hanna — July 18, 2015
- Hafez Hijaz & Sarah Al Ahmadieh — July 25, 2015
- Marco Mahar Bushra & Christine Talaat — July 26, 2015
- Imran Khan & Chandni Khan — July 31, 2015
- Cynthia Fenianos & Bernard Zeinoun — August 15, 2015
- Fadi Youssef & Randa Khoury — September 5, 2015
- Mohamad Al Abba & Ahmed Al Abbar — September 15, 2015
- Sultan Madi & Layal Abi Jomaa — October 3, 2015

| Tecman Industry |

- Nathalie Geagea & Maher Iskandar — July 5, 2015
- Roy Chiha & Christelle Abou Chakra — July 5, 2015
- Joseph Youssef & Rosy Al Bardawil — August 9, 2015
- Rita Matta & Elie Khadra — September 26, 2015

| Metrix |

- Antonious Sameh & Maryam Sameh — November 17, 2015

Newborns

| MAN Enterprise |

- Khaled Hussein, Layana — May 14, 2015
- Sujo Thomas, Elvin — June 4, 2015
- Karim Mirza, Ramzi — June 11, 2015
- Youssef Jouni , Jouni Fadel — June 30, 2015
- Fawaz Nakhoul, Jason — August 19, 2015
- Carole Salameh,Ilaya — September 28, 2015
- Kamil Paula Yere, Paul Sebastian Y. Nacion — October 8, 2015
- Rima Zeini, Yasmina — October 10, 2015
- Khalaf Al Faraj , Fatama — November 2, 2015

| Tecman Industry |

- Georges Sweid, Lukas — August 19, 2015

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