



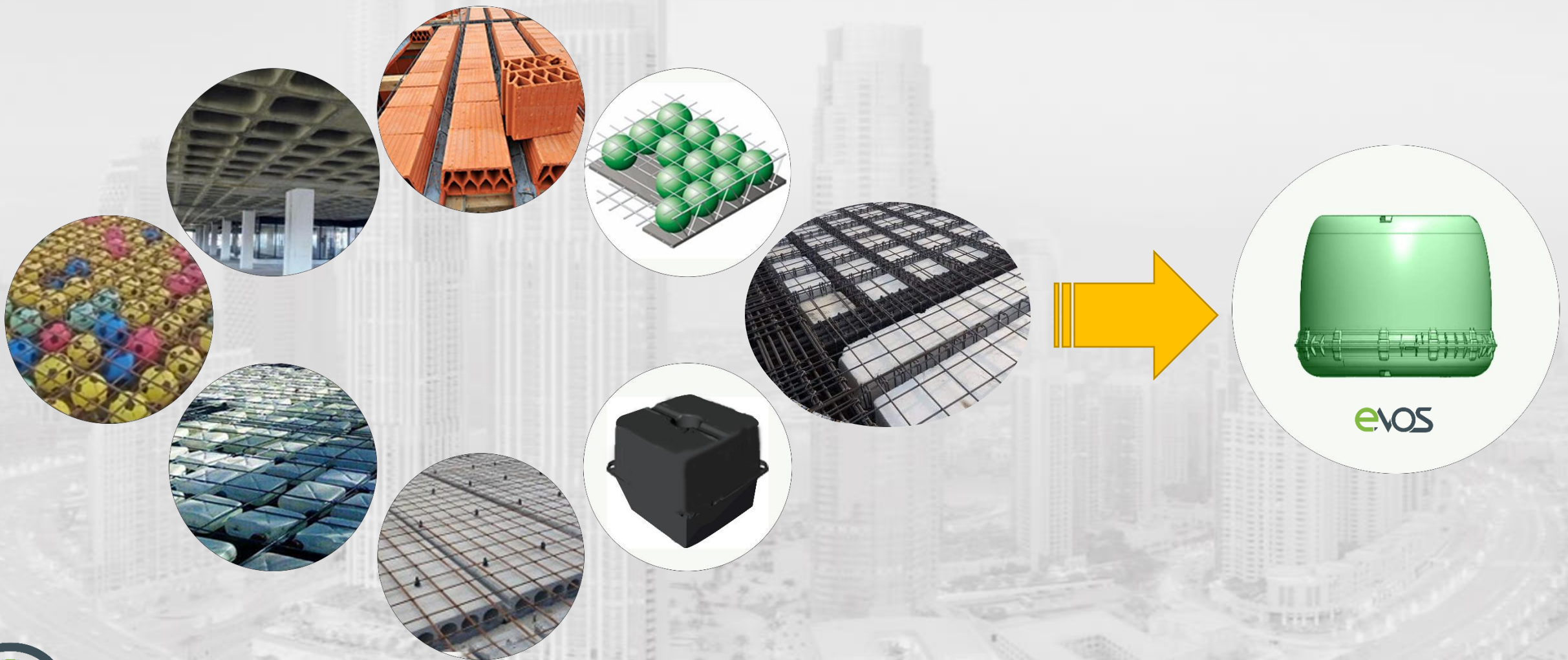
evos

Eco Voided Slabs



NEXT ERA
CME BUILDING CONTRACTING L.L.C

Types of Voided Slabs





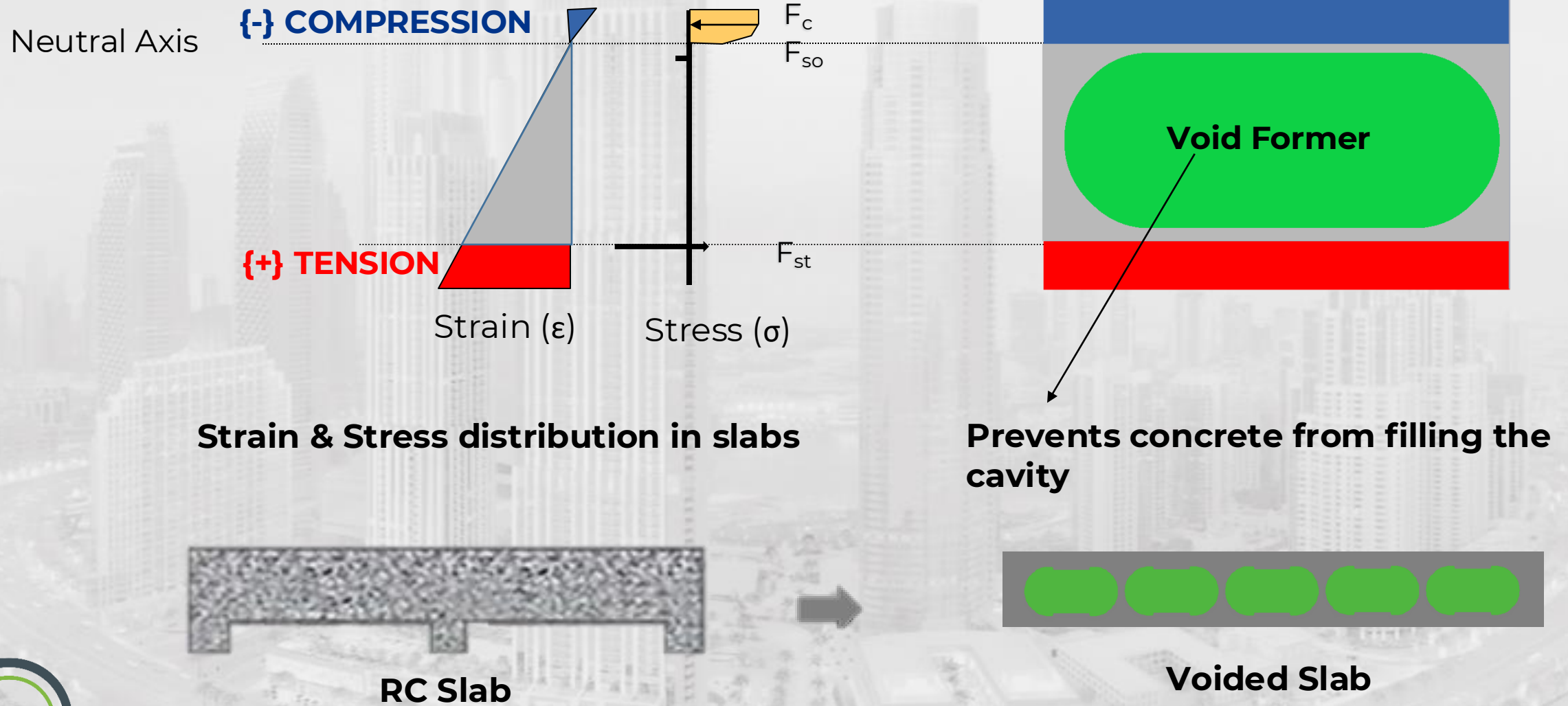
Why a Voided Slab System

eVos creates voids within concrete slabs in 30 – 80% of a slab's total area. Using eVos has engineering benefits, sustainability benefits, and economical benefits, which include but are not limited to:

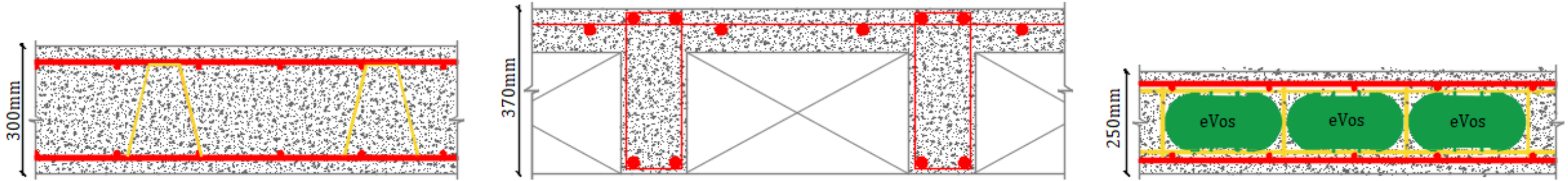
- 35% lighter slabs compared to solid slabs
- 15% thinner slabs compared to solid slabs
- 20 – 25% less structural weight
- 100% controlled concrete quantities
- Made from recycled plastics

- Spans up to 20 m
- Cylindrical oval shape with no sharp edges
- Available in different heights
- Equalization of stress distribution
- Decreased base shear for seismic activity

Engineering Concept



Section Comparison: eVos Slabs, Solid Slabs, Ribbed Slabs



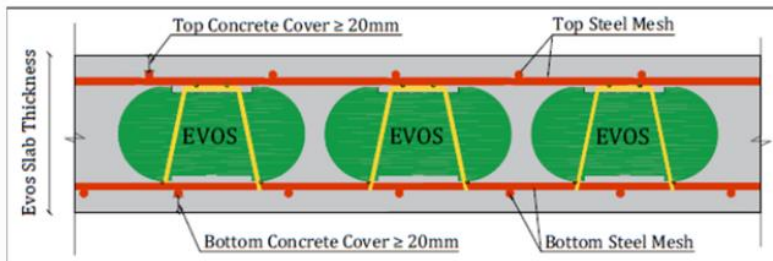
No.	Criteria	Solid Slab	Ribbed Slab	eVos Voided Slab
1	Slab Thickness	300mm	370mm	250mm
2	Section	Rectangle –Full concrete	T- Section	I-Section
3	Stiffness factor	100%	53%	93%
4	Steel Reinforcement (Kg/m ²)	39	48	27
5	Void Formers Material used	-	• Light weight block • Waffle • Polystyrene • AAC • Thermal Stone	Recycled Plastic

Voided Area in the Slab



eVos is a superior bi-axial voided slab system.

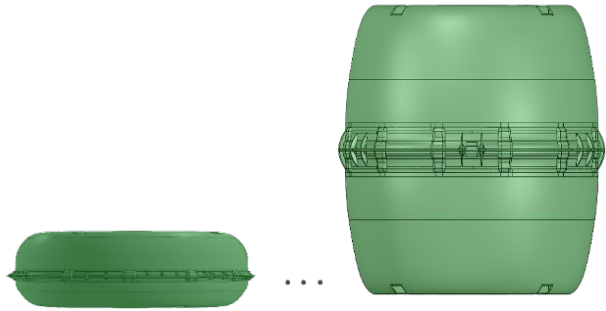
Voided area covers 30-80% of total slab area.



Slab Depth:
From 17.5 to 72.5 cm

Concrete star
between void
formers



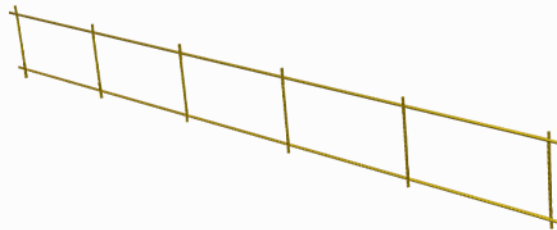


Heights from 8 to 54 cm

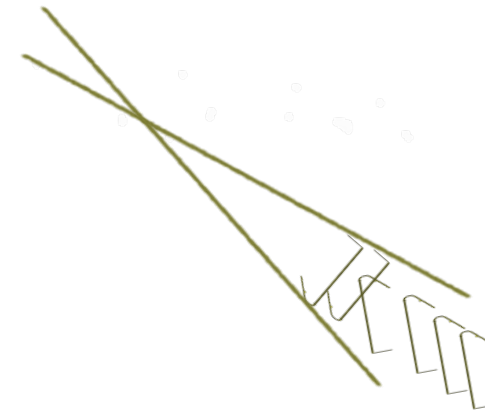
- 1 cm grading between 8 to 18cm
- 2 cm grading between 18 to 36cm
- 6 cm grading between 36 to 54cm

Plastic Void Formers have an oval cylindrical shape. They are made from recycled plastic and come in different heights according to the requirements of structural designs.

Option 1



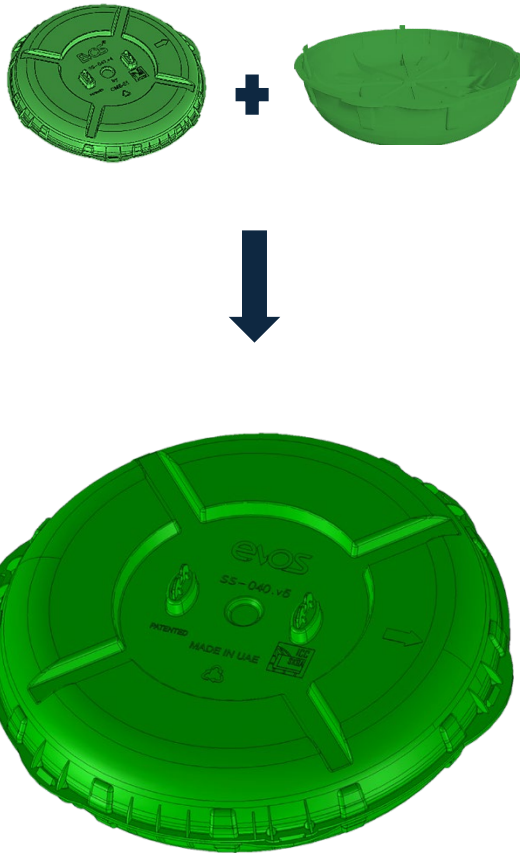
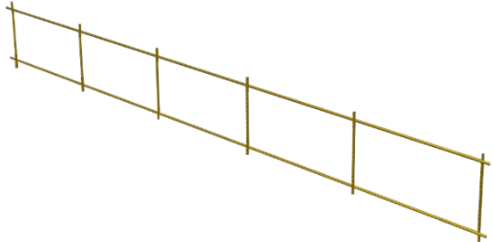
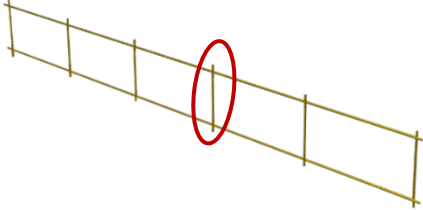
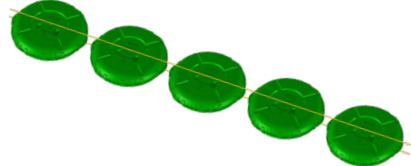
Option 2



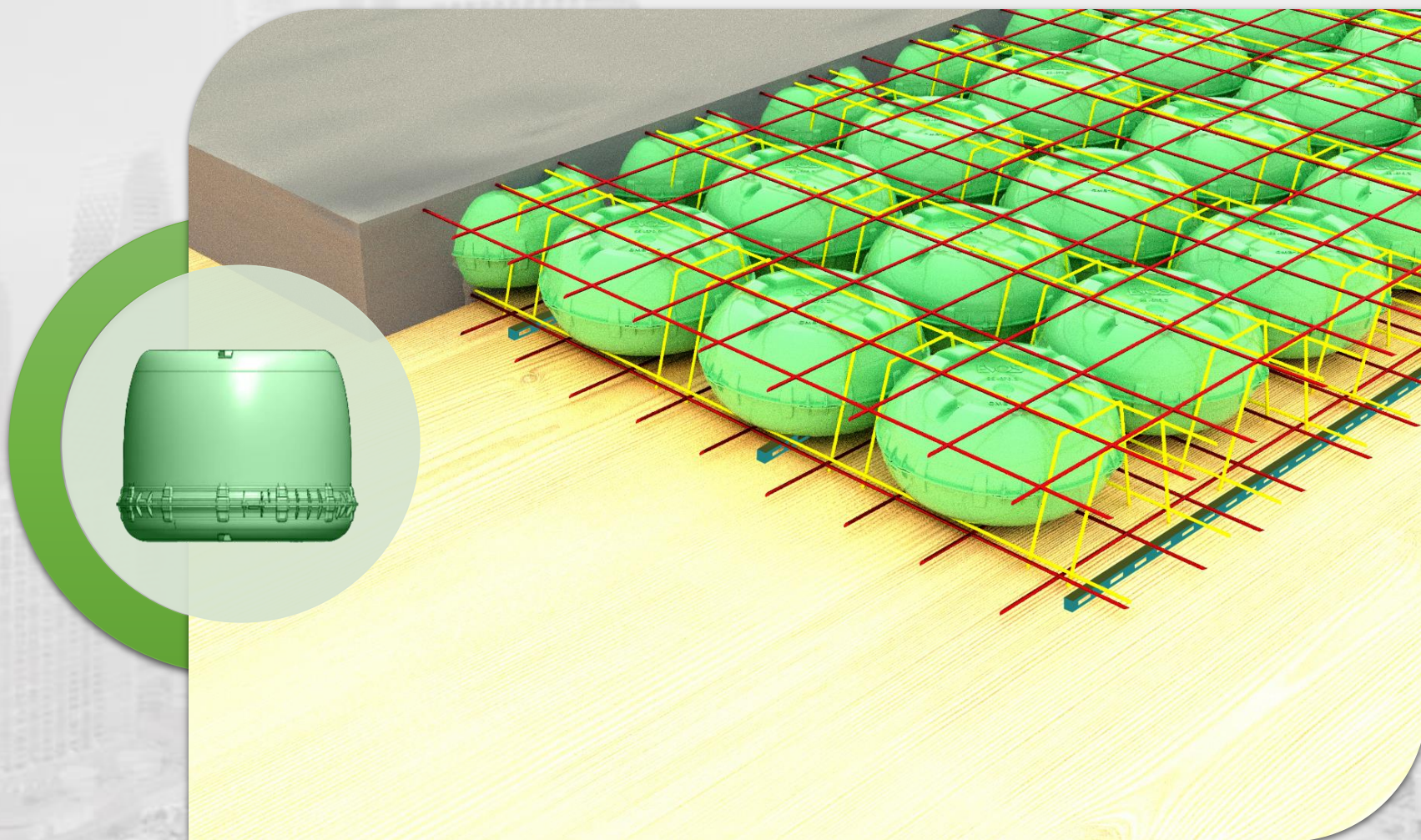
Steel Cages are used to position and secure plastic void formers in place. First cage serve as chairs for top steel, and as shear links between top and bottom concrete layers and secure correct spacing between plastics.



eVos Module Composing Options:

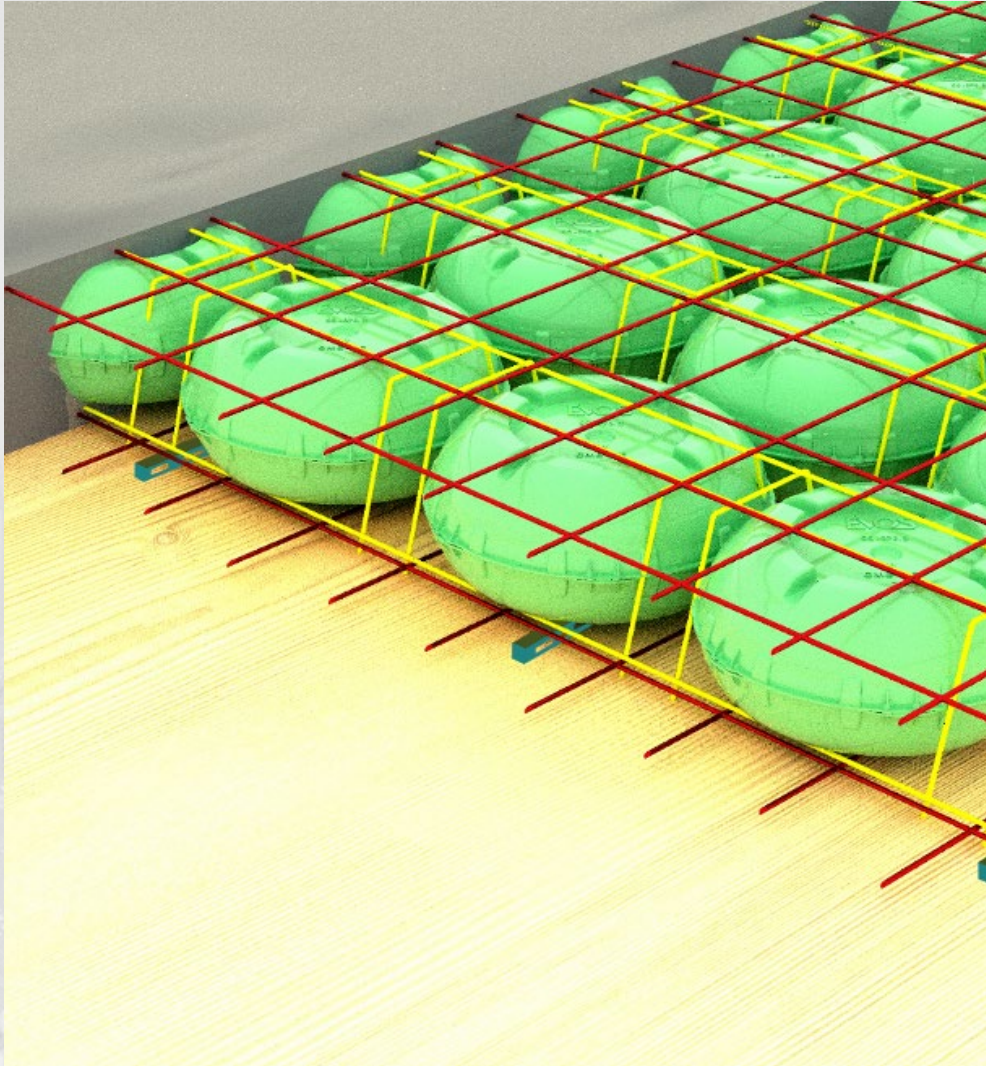
eVos Void Former	eVos Steel Cages options	Cages Description	Cold Joint Coverage	3D eVos Module
		Prefabricated, single-piece, factory-made, steel cage.	Covered by steel cage vertical bars 	
		Disjointed 2 steel bars, to be hooked to VF from top & bottom	Disjointed Steel hooks to be applied separately between each two void formers 	

EVOS in the slab



Action

Benefits

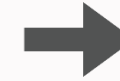


**Less
Concrete**

**Less
Thickness**

**Less
Weight**

**Less
Steel**



Engineering

Flexibility

Financial

Sustainability



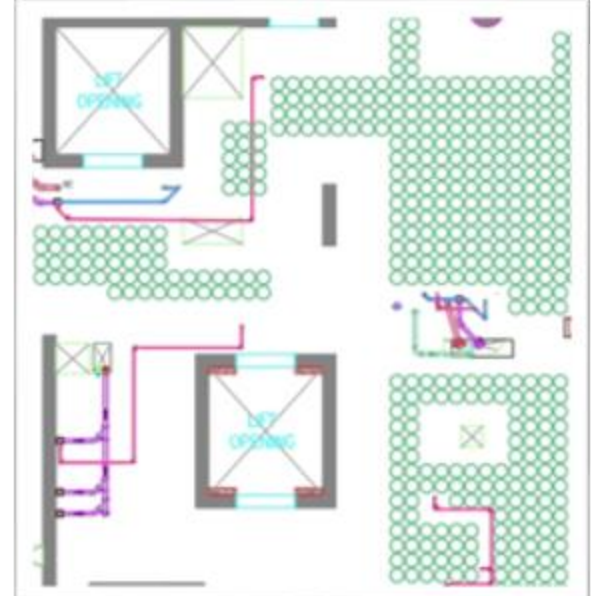
Engineering Benefits

- 35% lighter than solid slabs & 17% lighter than PT slabs
- 15% thinner than solid slabs & equal to or thinner than PT slabs
- Decreased base shear for seismic activity
- Fewer seismic dampers required
- Superior crack distribution control
- Assists with weak soil bearing capacity
- Significant optimization of vertical elements and foundation



Flexibility Benefits

- Flexibility in design
- Easy interchangeability of property functions
- Extra vertical space
- Easy MEP work
- Large spans with fewer columns
- No drop beams/Flat soffits
- Easy post-construction coring and opening
- Flexibility during construction, last-minute changes, work stages overlap, and multiple teams working simultaneously





Financial Benefits

- Less concrete and steel quantities in all structural elements
- Shorter construction time resulting in faster building turnover
- Enhanced architecture and increase in property value
- Fewer earthquake reinforcements required in slabs and vertical elements
- Fewer seismic dampers
- Less labour
- Decreased loads on formwork
- Fewer elevation materials



Environmental Benefits

Less Plastic Pollution

eVos VF is made from recycled plastic materials collected from city landfills.

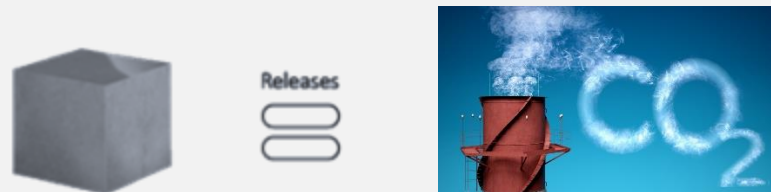


Less Traffic

Delivery of one 40ft container replaces in average delivery of 30 concrete mixers.



Less CO2



Production of 1 m³ of concrete releases 210 kg of CO₂ into the air

Design:

As per ICC and ACI eVOS Accreditation conclusions:

- “eVos Voided Concrete Slab System can be used to design and construct concrete slabs in accordance with ACI 318 requirements”.
- “All slab design requirements of ACI318 are complied with”.

eVOS slabs are designed as solid slabs according to ACI318 or any other code, using SAFE, ETABS or any other F.E Software, after considering below 3 factors:

- Dead Load Reduction
- Shear Factor
- Stiffness Factor

ACI 318-19

IN-1B Inch-Pound Units

An ACI Standard

Building Code Requirements
for Structural Concrete
(ACI 318-19)

Commentary on
Building Code Requirements
for Structural Concrete
(ACI 318R-19)

Reported by ACI Committee 318

 American Concrete Institute
Always advancing

 EUROCODES
Bridges: Background and applications

Dissemination of information for training – Brussels, 2-3 April 2008

EN 1992-2

EUROCODE 2 – Design of concrete structures
Concrete bridges: design and detailing rules

Approved by CEN on 25 April 2005
Published on October 2005

Supersedes ENV 1992-2:1996

Prof. Ing. Giuseppe Mancini
Politecnico di Torino



1 - Design Professional Indemnity (PI)


 شركة أبوظبي الوطنية للتكافل
 Takaful Abu Dhabi National Takaful Co., P.S.C.

For and on behalf of Abu Dhabi National Takaful Co P.S.C
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Structural Forms: eVOS Slabs Can Be Used...



as Flat Plate



with Drop/ Inverted Beams



with Drop/ Inverted Panels



with Precast Planks



with Post-Tensioned System









- No Special Concrete mix needed
- Max. aggregate size: 32 mm for slab thickness > 25 cm
- Max. aggregate size: 16 mm for slab thickness < 25 cm



eVOS Applications

- Commercial & Residential Buildings
- Villas
- Schools
- Hospitals
- Shopping Malls
- Stadiums
- Towers
- Car Parks





CMe References



Vida Residence, Downtown Dubai, UAE



- **Owner:** EMAAR PROPERTIES P.J.S.C.
- **Principal Consultant:** NORR ARCHITECTS & ENGINEERS.
- **Contractor :** AL-Basti & Muktha LLC
- **Third Party:** SALAMA Structural Engineers

Major Achievements:

- Added two additional floors
- 2,170 m³ of concrete saved
- 5,425 tons of weight reduced
- 456 tons of CO₂ emissions reduced

Sustainability Pavilion Expo 2020, Dubai, UAE



- **Owner:** Dubai World Trade Center Authority (DWTCA).
- **Project Management:** Emaar Properties.
- **Project Management:** CH2M Hills & Mace.
- **Architect:** Grimshaw Architects.
- **Consultant:** Buro Happold.
- **Contractor:** ASGC.

Major Achievements

- Lightweight slabs
- Span 13.0m
- Environmentally-friendly building with lower CO2 emissions

Opportunity Pavilion Expo 2020, Dubai, UAE



- **Owner:** Dubai World Trade Center Authority (DWTCA).
- **Project Management:** Emaar Properties.
- **Project Management:** CH2M Hills & Mace.
- **Architect:** AGI Architects.
- **Consultant:** Buro Happold.
- **Contractor:** ASGC.

Major Achievements

- Lightweight slabs
- Span 13.0m
- Decreased CO2 emissions

Nablus Businessmen Forum - Palestine



Morocco Pavilion Expo 2020, Dubai, UAE



- Developer: Dubai World Trade Center
- City: Dubai
- Authority (DWTCA)
- Consultant: E-Construct
- Contractor: ASGC

Lacasa Mall, Palestine



- **Owner:** Mr. Emad Jaber.
- **Consultant:** Lacasa Architects and Engineering Consultants.
- **Contractor:** Lacasa Contracting Co.
- **Project Area:** 34,700 m².
- **Span :** 20 meter.

Major Achievements.

- The LARGEST voided slab area worldwide, measuring 52 m x 20 m.
- When the project was changed from a school into a mall, opening and coring were made possible by CME.

Hayat Commercial Building, Palestine



- Owner: Mr.Shaltaf.
- Architect: Amara Office.
- Contractor: Shaltaf Contracting Co.
- Project Area: 13,147 m².
- Year: 2013.

The VUE Project, Saudi Arabia



- Owner: LIFESTYLE –DEVELOPERS
- Hybrid solution (with Partial Post Tension).
- Number Of floors: 17 Floors.

Major Achievements

- A cantilever of 4.5 m
- Increased the spans
- Minimized the need for drop beams

Jermo Hotel, Betlehem, Palestine



Center of Excellence, Dubai, UAE



- Owner: Emirates Health Care Development Corporation Dubai.
- Consultant: Eng. Adnan Saffarini.
- Contractor: IHCC.
- 3rd Party: Qualiconsult.



LFTZ Residential Tower, Nigeria



Client : LAGOS FREE ZONE COMPANY

Consultant : SANA GLOBAL

Major Achievements:

- CO₂ emissions reduced: 22.6 tons
- Dead load reduced: 268.65 tons
- Concrete reduced: 107.50 m³



Bin Dalmouk Project, UAE



- **Owner:** Mr. Abdulraouf Mohammad Alavi.
- **Consultant:** Bin Dalmouk Engineering Consultants.
- **Contractor:** CJ Tec Contracting LLC.
- **Project Area :** 16,000 m².
- **Year:** 2019

Al-Rashid Extension Hospital – Phase 1, Jordan



- **Owner:** Al-Rashid Hospital.
- **Consultant:** Abstract Design.
- **Contractor:** Ratio Contracting Co.
- **Year:** 2018

Larnaca Complex, Cyprus



Owner : Consultant : CivilPro TECH ENGINEERING CONSULTANTS

Eilas Hotel, Bethlehem, Palestine



Al Jaddaf Residence, Dubai, UAE



- **Owner:** Khansaheb.
- **Consultant:** Omar Moujaes Architect.
- **Contractor:** Khansaheb.
- **Number of floors:** 15

Assima Tower, Kuwait



- **Owner:** SALHIA Real Estate Company K.S.C.
- **Main Consultant:** PACE – architecture and engineer planning.
- **Main Contractor:** Ahmadiyah Contracting & Trading Co.
- **3rd Party consultant:** ARCADIS Design and Consultancy.
- **Floors:** 54 Floors.
- **Areas:** ~ 100,000 m²

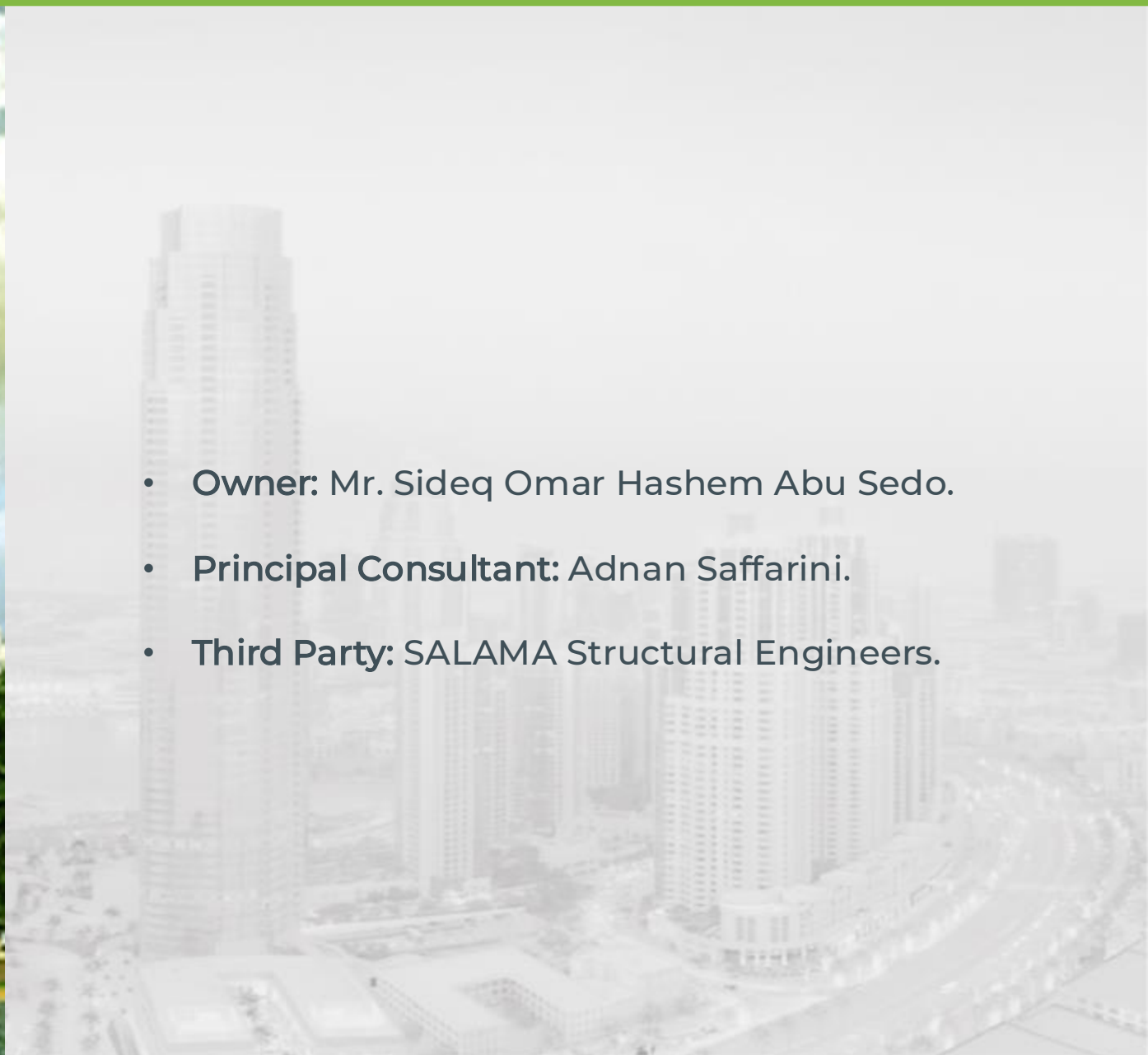
Major Achievements

- Achieved high productivity on the job site.
- Decreased the thickness of the slabs
- Eliminated the drop beams

Hotel at Dubai Palm Jumeirah, Dubai, UAE



- **Owner:** Mr. Sideq Omar Hashem Abu Sedo.
- **Principal Consultant:** Adnan Saffarini.
- **Third Party:** SALAMA Structural Engineers.



Jafra Commercial Building, Palestine



- **Consultant:** Arcade International Engineering & Real Estate Investment.
- **Project Area:** 10,000 m².
- **Year:** 2018.

Al-Thumama Palace , Old south airport, Qatar

PRIVATE VILLA
QATAR-DOHA ALTHUMAMA
FOR
MR. BADR HAIDOS

- **Owner:** MR.BADR MAHMOUD J.A.HEIDOS.
- **Engineering Office:** Eng. Adnan Saffarini.

Major Achievements

Fulfilled the architectural requirements of the building.

ENG. ADNAN SAFFARINI
Design, Supervision & Consultants

Arkan Mall - West Abu Fatira, Kuwait



- **Owner:** Shuwaikh Gate Holding Company K.C.S.
- **Main Consultant:** RAWSAM Engineering & Consulting.
- **Main Contractor:** Al- Kuthban Kuwaiti Contracting Company.
- **Project Floors:** 3 stories in 16 unit.
- **Area:** ~ 20,000 m².

Ramallah Mall, Palestine



- **Architect:** Amjad Shuaibi Architects.
- **Contractor:** Al-Zuq Contracting Company.
- **Project Area:** 18,000 m².
- **Year:** 2014.



Arab American University - GSB, Palestine



- **Owner:** Arab American University.
- **Architect:** Eng. Hani Al-Hassan.
- **Contractor:** AZ Group.
- **Area:** 5,907 m².
- **Year:** 2015.



Sheikh Zayed Desert Learning Centre, Al Ain, UAE



Owner: Al Ain Wildlife Park & Resort, Abu Dhabi.

Structural Eng.: Bollinger – Grohmann – Schneider, Vienna.

Architect: Chalabi Architects & Partners, Vienna.

Contractor: Ed. Züblin AG, Abu Dhabi.

Dorrah Mall, Kuwait



- **Main Consultant:** RAWSAM Engineering & Consulting.
- **Main Contractor:** Al- Kuthban Kuwaiti Contracting Company.
- **Project Floors:** 9 stories in 3 Buildings / Vertical Extension for 9 floors above the ground and one basement.
- **Area:** ~ 16,500 m².

Mr. Amer Qaqesh Villa, Jordan



- **Owner:** Mr. Amer Qaqesh
- **Engineering Office:**
Wael Hamarneh Architects
and Consultant Engineers

Canal, Dubai, UAE



UPTOWN DUBAI Phase 1, Dubai, UAE



Qiba Mosque, Palestine



Consultant : FADI BADER Engineering Office



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Dubai, UAE



THANK YOU