GREEN HEIGHTS CONTRACTING
Development you can trust!

ICF CONSTRUCTION SYSTEM

by GREEN HEIGHTS CONTRACTING LLC

CONTENT

INTRODUCTION

Green Heights Contracting and its team has been engaged in construction projects for over twenty-one years in Dubai, United Arab Emirates.

Green Heights has continued to strive towards becoming a complete multi-disciplinary practice offering our Clients the specialist individual attention and solutions required by an ever-changing project requirements. Green Heights sees teamwork on every project as the key success element and is responsible for creating this environment.

Our vision is to grow our multi-disciplinary team in order to offer a broad spectrum of specialist construction services to become our clients' preferred Professional Service Provider (PSP) through excellence and efficiency in all aspects of the building project life cycle. Whether it is a one villa project, a group of villas or a commercial project, Green Heights is a leading practice that will exceed expectations and set new standards!

ICF – INSULATED CONCRETE FORM

ICF blocks consist of two panels of **Expanded Polystyrene Sheet (EPS)** which are held together with cross ties or 'webs' made of **High Density Polypropylene (HDPP)**.

TYPES OF STRUCTURES

VILLAS

SCHOOLS

HOSPITALS

WAREHOUSES

LABOUR CAMPS

HIGH RISE BUILDINGS

CONSTRUCTION PROCESS

Concept

Foot Wall

GF Wall

FF Wall

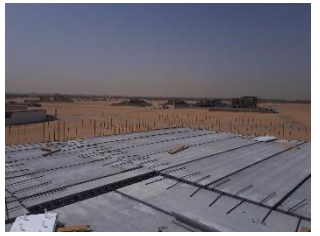
Structure

1 Foundation

2 Ground Slab

3 1st Slab

4 2nd Slab



5 **Reality**

6 7 8

FOUNDATION

- Footings are installed according to applicable building codes & engineering requirements.
- ICF construction is easily accommodated with the strip footing.
- Slab on grade can be easily merged or blended into strip footing, if required.

RAFT FOUNDATION

STRIP FOUNDATION

ICF WALLS

- ICF blocks are stacked similar to LEGO blocks in accordance with the required dimensions.
- Steel reinforcements are placed horizontally on the connecting webs within the ICF block and vertically placed with the help of PVC sleeves.

BASE BLOCKS

BLOCK STACKING

STEEL REINFORCEMENT

WALL OPENINGS AND SHAPES

- ICF walls allows custom shapes like round and angular walls, arches, large openings, domes, etc., with much ease, precision and finish.

CIRCULAR WALLS

ANGULAR WALLS

LARGE OPENINGS

ARCHES

WALL BRACINGS AND SUPPORTS

- Wall bracings and alignment systems are placed only in internal side, thereby reducing the space requirement and hardware.

CONCRETING

- Concrete mix is poured into the cavity of the ICF blocks to create an insulated solid concrete wall.



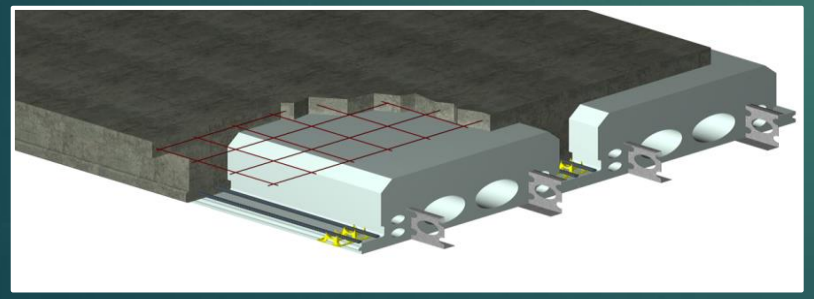
- ICF system helps to achieve full floor height of 4 meters (or more, if required) in a single day, and concrete mix pour in one go.

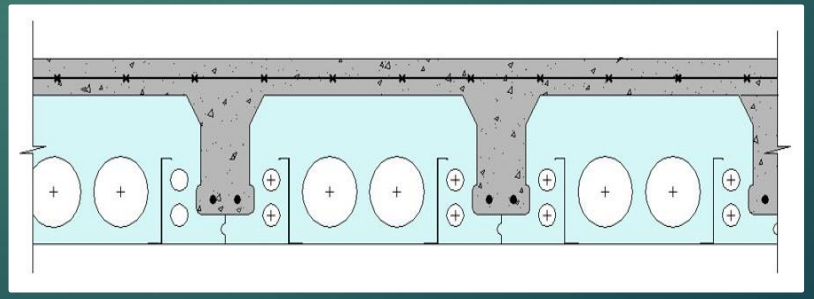
SLAB AND ROOF

- ICF construction easily accommodates various types of slabs, as follows:

STEEL STRUCTURAL ROOF

HOLLOW CORE PRECAST





RIB BEAM – PLASTBAU SLAB

INTERNAL PARTITION

- Various types of internal partitions can be used.
- As most of the ICF construction is column free, internal partitions can be removed and relocated at will.

CONCRETE BLOCK

GYPSUM BOARD

AAC WHITE BLOCK

MEP INSTALLATIONS

- MEP work is accomplished in very easily and speedily.
- Up to 2 ½ inch pipes can be easily installed within ICF block.
- There is no disturbance to the structure.

FORM CUTTING

CONDUITS

JUNCTION BOX

CAVITY REFILLING

INTERIOR FINISHES

- ICF construction easily accommodates various types of interior finishes.

POLYMER PLASTER

GYPSUM BOARD PLASTER

CEMENT PLASTER

EXTERIOR FINISHES

- Different exterior finishes and claddings can be accommodated in ICF construction.

POLYMER PLASTER

ALUMINIUM CLADDING

BRICK CLADDING

STONE CLADDING

BENEFITS OF ICF SYSTEM

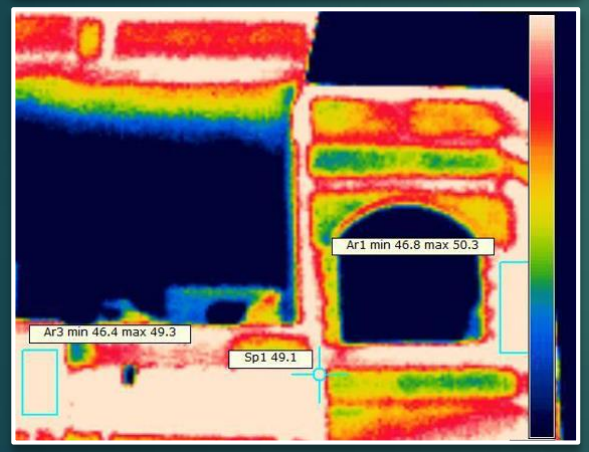
- High insulation & air tightness **60%**
- Electrical savings **60%**
- AC tonnage savings **50%**
- Annual maintenance savings **60%**
- High sound insulation **55**

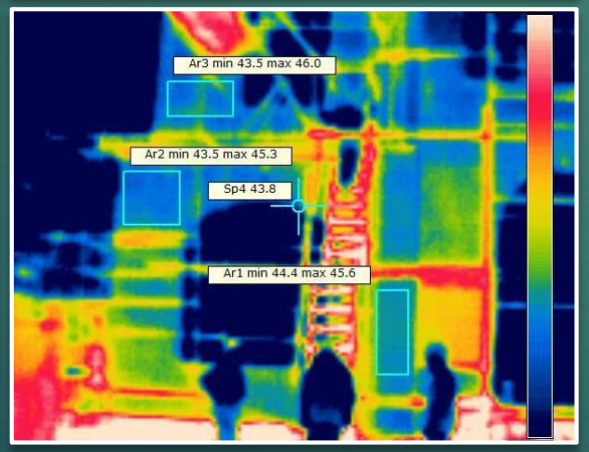
ZERO ENERGY DESIGN

- **60%** Fast construction
- **70%** Less wastage
- **50%** Less labor
- **100+** Extended life span (years)
- **4+** Fire retardant

HIGH INSULATION

LESS HEAT TRANSMISSION





- ICF provides excellent heat insulation thereby reducing heating and cooling requirements.

LESS SOUND TRANSMISSION

- ICF provides superior insulation against the airborne sound.

ENERGY AND AC TONNAGE

- Due to double and continuous insulation, temperature loss and heat transfer is greatly reduced, thereby reducing the air conditioning requirement by up to 50%.
- Due to reduced air conditioning, energy consumption is reduced by 50% to 60%.

AC TONNAGE AND ENERGY SAVINGS COMPARISION TABLE

DESCRIPTION	CONVENTIONAL	ICF SYSTEM
Total AC requirement (Ton)	200	50
Cost of installation (AED)	700,000	175,000
Operational expenses (AED)*	443,256	110,814
Maintenance expenses (AED)**	60,000	15,000
Expense over 5 yrs. period	3,216,280	804,070
Total savings (AED)	**2,412,210**	**75%**
Carbon Footprint per yr.	771,186	192,797

Project: G+2 warehouse & office building @ DAFZA, Dubai, UAE

* Operational expenses are assumed @ AED 0.23 per kWh.

** Maintenance expenses are assumed @ AED 150 per ton.

ICF SYSTEM – GATEWAY TO ZERO ENERGY DESIGN (ZED)

- In order to achieve ZED the cost of the project is increased by 60% to 70% in conventional construction.
- Our challenge is to achieve ZED without increase in the cost of the project.
- **Solution**: By improving the energy efficiency of the building through ICF system and by reinvesting the savings achieved in HVAC towards the Solar energy, ZED can be easily achieved.

LESS WASTAGE AND MORE CLEANLINESS

CONVENTIONAL SYSTEM

ICF SYSTEM

FIRE RESISTANCE

- These photos are of actual burn test conducted, where gasoline was poured on the ICF block and set on fire. As soon as the gasoline was burned off, the fire was extinguished.
- Since, the ICF construction method has minimal 'Air Space', it restricts the spread of fire.
- Other than solid concrete, this is one of the highest rated fire retarding wall system available.

LOWER MAINTENACE

ICF House does not require any maintenance usually for at least minimum of 15 yrs.

- G+2 Warehouse and office at DAFZA, Dubai, UAE
- Completed and handed over on 2010. Owner didn't do any maintenance till date.

CRACK FREE

BULGE FREE

MOLD FREE

SEISMIC RESISTANCE

LABOR FORCE AND CONSTRUCTION TIME

- Number of steps needed in ICF system are lot less than the conventional system. Due to this, lot of labor force and construction time can be saved.
- Light weight and easy installation processes allows the work to finish sooner.

CONVENTIONAL CONSTRUCTION

12 WEEKS

ICF CONSTRUCTION

CONSTRUCTION ACTIVITIES COMPARISION

25

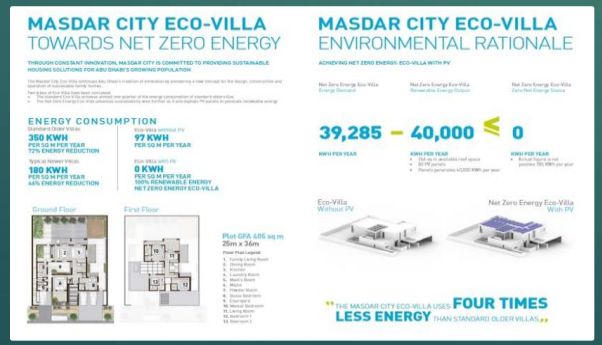
	CONVENTIONAL SYSTEM	ICF SYSTEM
SUB STRUCTURE	➢ Footing ➢ Neck column ➢ Solid block work ➢ Back filling ➢ PCC for tie beam ➢ RCC for tie beam ➢ Again back filling and ➢ Slab on grade *Shuttering is required for most of he activities.*	➢ Footing, ➢ Footing wall ➢ Back filling and ➢ Slab on grade *Shuttering is required only for footing.*
SUPER STRUCTURE	➢ GF column ➢ Slab ➢ External block work ➢ Internal block work ➢ Insulation (if required)	➢ GF wall ➢ Slab ➢ Internal partition ➢ Insulation (in build)

PROUD PROJECTS

G+2 WAREHOUSE AND OFFICE PROJECT AT DAFZA, DUBAI

G+1+R VILLA AND SERVICE BLOCK PROJECT AT AL AWEER, DUBAI

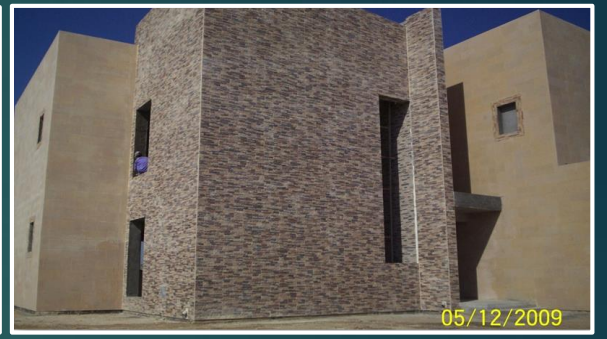
G+1 ECO VILLA PROJECT AT MASDAR CITY, ABU DHABI



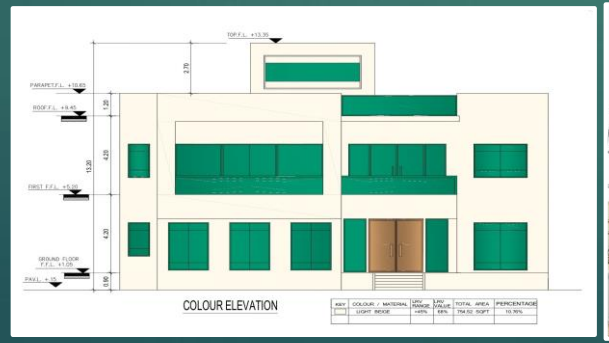
PROUD PROJECTS

G+1+R VILLA PROJECT
AT AL WARQA, DUBAI

G+1+R VILLA & SERVICE
BLOCK PROJECT AT
OUD AL MUTEENA, DUBAI



G+1+R VILLA PROJECT
AT AL WARQA, DUBAI



APPROVALS AND CERTIFICATIONS

- APPROVALS

- CERTIFICATIONS

SITE VISIT BY AUTHORITIES


- DUBAI MUNICIPALITY AND CIVIL DEFENCE VISIT AT DAFZA WAREHOUSE PROJECT


- DUBAI MUNICIPALITY AND CIVIL DEFENCE VISIT AT OUD AL MUTINA VILLA PROJECT

SITE VISIT BY DIGNITORIES

H.H. Sheikh Hamdan Bin Zayed Al Nahyan visits Eco Villa at Masdar City, Abu Dhabi

SITE VISIT BY DIGNITORIES

H.E. Dr. Sultan Ahmed Al Jaber, Minister of Industry and Advanced Technology and Chairman of Masdar visits Eco Villa at Masdar City, Abu Dhabi

AWARDS AND ACHIEVEMENTS

Selected among the top 100 companies of Dubai out of 72,000 SMEs and awarded by **H.H. Sheikh Ahmed Bin Saeed Al Maktoum** under Mohammed Bin Rashid Establishment for SME Development (Dubai SME).

AWARDS AND ACHIEVEMENTS

Awarded for the **Best Green Construction System (2013)** by **Emirates Green Building Council (EGBC)**, Dubai, U.A.E.

AWARDS AND ACHIEVEMENTS

Awarded for the **Best Green Construction System (2014)** by **bgreen Magazine**.

AWARDS AND ACHIEVEMENTS

Finalist in the General Construction category at the **GAIA Awards (2015)** at THE BIG 5 Exhibition.

AWARDS AND ACHIEVEMENTS

Awarded for the **Green ERA Award (2015)** by **OTHERWAYS Management Association**, Germany

Monday, February 2, 2015

ASSOCIATION OTHERWAYS
MANAGEMENT & CONSULTING

Mr. Abdul Razzak Malik
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UNITED ARAB EMIRATES

Dear Mr. Abdul ,

"OMAC" Otherways Management Association Club-Paris will be celebrating:

"The Green Era Award & the Green Economy Forum"

This Forum offers an unparalleled networking opportunity allowing you to meet renewable energy firms, waste management authorities, green building councils, environmental agencies, and green companies from around the globe involved in saving our planet earth.

Otherways will grant *"The 2015 Green Era Award"* to those who have made sustainability a key driver in their business strategy.

The selection committee has decided to grant ""Royal City Contracting"" this Green Award that recognizes organizations for their outstanding environmental achievements and sustainable practices.

In the last 2 decades, we were able to gather thousands of companies, organizations and governmental institutions from more than 130 countries. We will be glad to provide you the list of the previous awardees from your country (upon your request) and the criteria that led to your selection.

Because you've already begun integrating sustainable practices, the Forum also offers valuable tools to expand your efforts and realize greater benefits going forward and to cultivate potential bottom line of sustainability.

An exceptional Prize Giving Ceremony will take place on the **23rd of March 2015** at the **Intercontinental Hotel Berlin -Germany**, whereby **OMAC** will be celebrating its **15 Year Anniversary** of continual services, following a Cocktail Reception and a Gala Dinner.

Dear Mr. Abdul, to confirm your attendance at your earliest convenience, please send the Registration Form (Found on the Back) by email to: awards@greenera award.com / www.greenera ward.com

Cordially,

Charbel S. Tabet
President-CEO

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GALLERY

G+1 ECO VILLA @ MASDAR, ABU DHABI



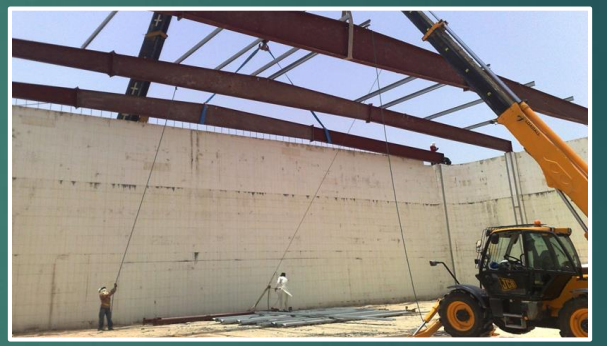






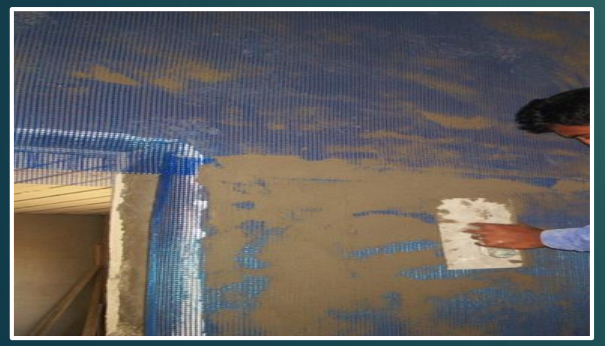


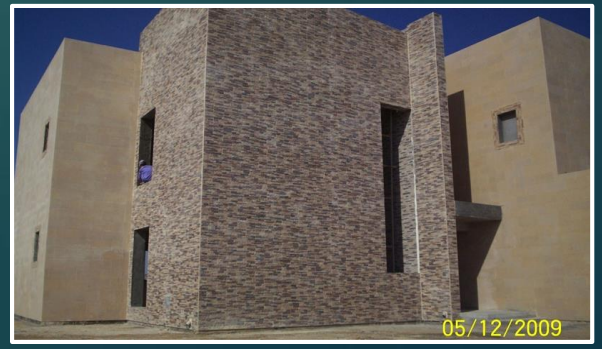
G+2 WAREHOUSE & OFFICE @ DAFZA, DUBAI



G+1 VILLA @ AL WARQA, DUBAI

G+1 VILLA @ OUD AL MUTEENA, DUBAI





WORKING TOWARDS SUSTAINABLE FUTURE

ICF is a superior construction system that ranks high on the sustainable and green standards while economically competing with the conventional system and exceeding long term benefits in form of operational and maintenance cost.

THANK YOU