

TECHNE™ - STRUCTURA **HOUSING SYSTEMS**

Construction Technologies

TECHNE™-STRUCTURA

HOUSING SYSTEMS

BENEFITS OF TECHNE™-STRUCTURA HOUSING SYSTEM OVER 60 YEARS OF PRODUCTION

Best Quality Manufacturing



Best Engineering



Best Pre-Construction Quality Assurance



MANUFACTURED & ENGINEERED
KANSAS CITY, MO USA

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HOUSING SYSTEMS

BENEFITS OF TECHNE™-STRUCTURA HOUSING SYSTEM

Best Customer Service and Retention



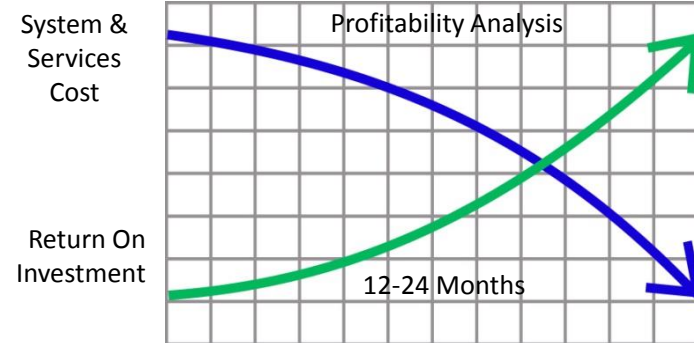
OVER 60 YEARS OF SUCCESSFUL HOME
CONSTRUCTION

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BENEFITS OF TECHNE™-STRUCTURA HOUSING SYSTEM

Best Services for Project Optimization



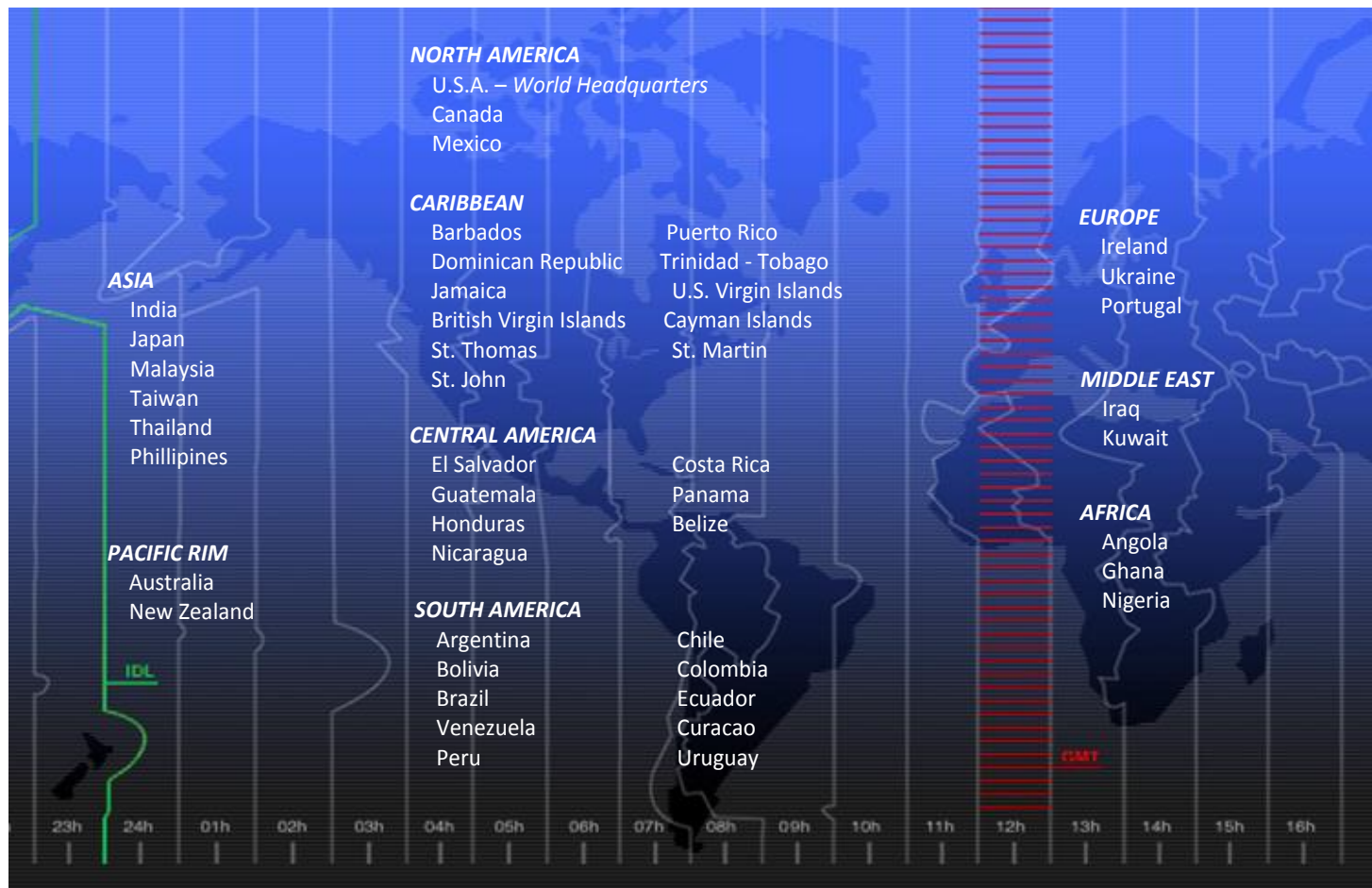
- STRONG CONTINUOUS FACTORY SUPPORT
- HIGH QUALITY CONTROL

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HOUSING SYSTEMS

TECHNE™-STRUCTURA HAND SET ALUMINUM FORMS
500,000 HOMES BUILT IN 2017
4 CONTINENTS 50 COUNTRIES

In 1974 we delivered it's first international sale to Sovipe, Nicaragua's largest private home builder. Today, our products and services are used in over 50+ countries with international sales accounting for over half of the company's business.



ADVANTAGE FOR LOW and MID-RISE CONSTRUCTION

- Flexible Design
- **Fast Building Cycle (1) DAY per floor**
- Cast in Place Steel Reinforced Construction
- Integrated Design & Construction reduces weight
- Light Weight Aluminum Forms reduce scaffolding & Crane Time
- Plumbing and Electrical Integrated into Concrete Cast walls and ceilings
- Large reduction in finishing costs
- Strong Quality Control & Production Tolerances

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SUMMARY OF OPERATIONS IN SAUDI ARABIA

- Uses Proprietary **Hand-Set Adjustable Aluminum Form System** to Build Steel Reinforced Concrete Villas and Apartments that are:
 - Highly Energy Efficient “Green”
 - Use **75% + less Energy**
 - Application of Solar Power for Heating, Cooling, and Hot Water
 - Use **75% less water**
 - Rapid Construction time: **60 days to complete a villa**
 - Flexible Design: system allows for “bespoke” construction
 - Proven Track Record: 50 Countries, 4 Continents, **500,000 homes built annually**
 - Cranes not required
 - High Quality: Standardized **construction**
 - **Turn Key Project: 100% complete** villa & apartment delivered
 - Design, Engineering, Energy Efficient Shell & Interior

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HOUSING SYSTEMS

MANUFACTURING & ENGINEERING

ADJUSTABLE FORMS DESIGNED AND MADE IN USA

60 YEARS EXPERIENCE DEVELOPING
HAND-SET ADJUSTABLE ALUMINUM
FORMS

STRONG QUALITY CONTROL

ALL FORM MANUFACTURING IN OUR
OWN USA FACTORY

INTEGRATED PRODUCTION SUPPLY CHAIN

INTERIOR & EXTERIOR COMPONENTS
FROM GCC

“WORLDS BEST”

ADJUSTABLE HAND-SET ALUMINUM
FORM SYSTEM

“No Construction Cranes Needed”



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HOUSING SYSTEMS

ENGINEERED IN USA

ADJUSTABLE ALUMINUM FORM METHOD
THE KEY TO OUR SYSTEM

“WORLD CLASS”

ADVANCED ENGINEERING AND
“CAD” DESIGN SYSTEMS
INTEGRATED DESIGN AND ENGINEERING

STRONG QUALITY CONTROL

ALL HAND-SET ADJUSTABLE ALUMINUM
FORMS:

TEST PRE-ASSEMBLED IN FACTORY
FINAL INSPECTION BEFORE SHIPMENT



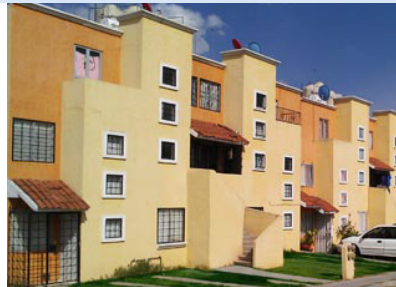
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Low Rise



Mid Rise



High Rise

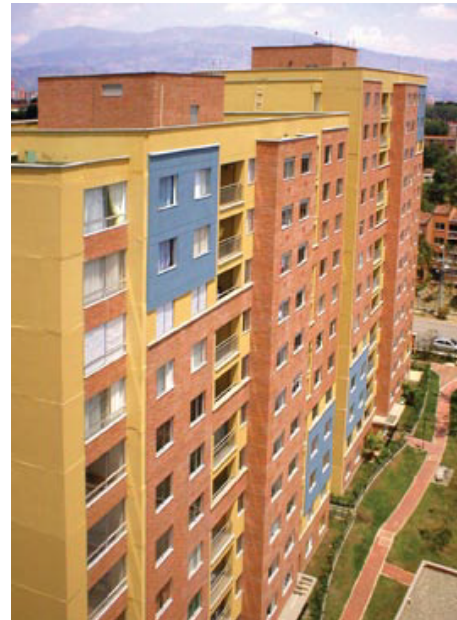


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Argentina • Australia • Barbados • Belize • Bolivia • Brazil • Canada • Chile
Colombia • Costa Rica • Dominican Republic • Ecuador • Egypt • El Salvador
Ghana • Guatemala • Honduras • India • Iraq • Ireland

- Engineering assistance with project development
- Full advantage of cast-in-place concrete
- Customized, on-site technical support
- 2000 to 3000 pours - Per Panel or set
- Innovative hardware options
- Consistent smooth or textured wall finishes



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Jamaica • Japan • Kuwait • Malaysia • Mexico • Nicaragua • Nigeria • Panama •
Philippines • Portugal • Puerto Rico • St. Martin • St. Thomas • St. John • Taiwan
Thailand • Trinidad & Tobago • USA • Ukraine • Venezuela

- Lightweight panels - weighing less than 40kg

(900 mm x 2400 mm)

- Versatility - Adaptable to most architectural designs

- Industry Expertise

- Increased profits - long term investment

- Hand-set ease

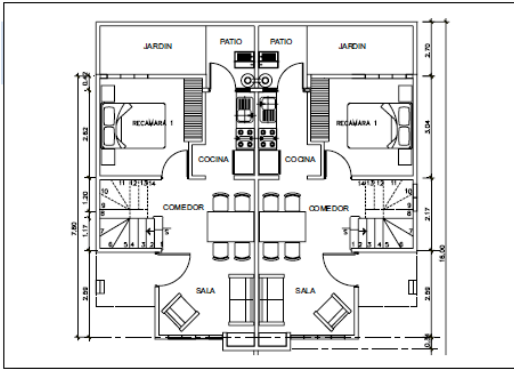
- Cost savings of 10% to 30% compared to masonry



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ALUMINUM FORM SYSTEM ENGINEERING & DESIGN PROCESS



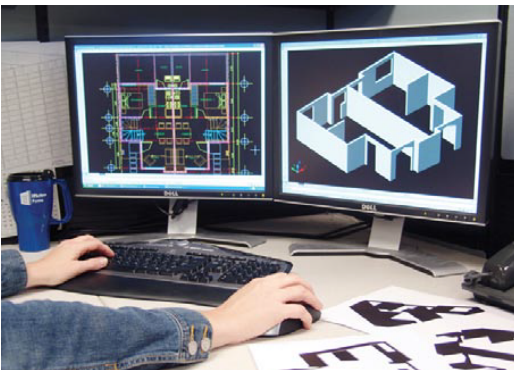
1. Send TECHNE Structura Your Blueprints

- Select a project for consideration of Cast-In-Place construction using Removable Concrete Forms.



3. Review System Proposal & Recommendations

- TECHNE Structura will review the proposed solution, alternatives, costs, and benefits.
- A variety of equipment and financing options tailored to your needs are offered.



2. Evaluate & Layout Formwork

- The TECHNE Structura design and technical team will evaluate your project and consult with you to develop a solution that meets your quality, cycle time, and final budget requirements.



4. Build with Poured Concrete Technology

- A complete TECHNE Structura system can be manufactured and on your job site in a matter of weeks.
- When your equipment arrives, so do our TECHNE Structura technicians to immediately assist your team.

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CONSTRUCTION SEQUENCE

FLEXIBLE DESIGN - FAST CONSTRUCTION

Step 1: Pour Slab with Stub Utilities



Step 2: Install Rebar and Utilities



Step 3: Set Formwork



Step 4: Set Ceiling System



Step 5: Pour Walls & Roof



Step 6: Strip Forms



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Why Industrialized Construction Process

Reduced Shell Construction Time With Cast-In-Place (CIP) Construction Methods



Conventional Method in Saudi Arabia

36 business days to finish structure –
2,072 man hour



Cast in Place concrete Shell

3 days – CIP Method:
864 total man hours

CIP construction can save 1,208 man hours / \$ 3,986 per house, labor savings

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Example Low Rise Project - One House per Day | Horizontal Formwork Cycle | TECHNE™-STRUCTURA systems and associated construction processes are regularly designed and implemented to produce one concrete shell per day. A proven example of this capability is demonstrated below.

- Start-up: Year 1 with full service/support
- 4 sets of forms
- Year 1 – built 1,000 units
- Year 2 – built 2,500 units
- Year 3 – built 4,000 units
- Client currently has 28+ sets of TECHNE™-STRUCTURA Forms and building 7,500+ units annually



In ten working days, nine 2-story housing shells are cast-in-place using TECHNE™-STRUCTURA Forms

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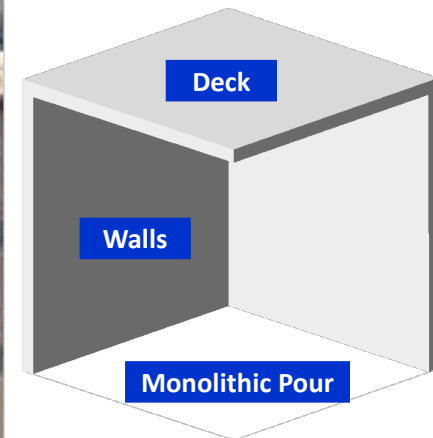
VALUE PROPOSITION

INDUSTRIALIZED CONSTRUCTION PROCESS PERFORMANCE DELIVERED

One Floor Per Day | This cast-in-place, concrete shell, was poured in 5 days with Forms. The 5-story structure implemented a load bearing “wall/slab” design and was cycled at the rate of one floor per day, including all inner walls, with a crew of 40 workers.



Each floor consisted of approximately 400 m2 of living space.



Walls and decks were cast-in-place with Western Forms in a one-step monolithic pouring process for each floor.

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CASE STUDY

INDUSTRIALIZED CONSTRUCTION PROCESS



- 240 units
- 7 - 3 story structures
- 12 & 14 apartments per floor
- 1,2, & 3 bedroom apartments
- 40-55m²/apt.
- Monthly rental rate: \$800 -\$1200/mo.

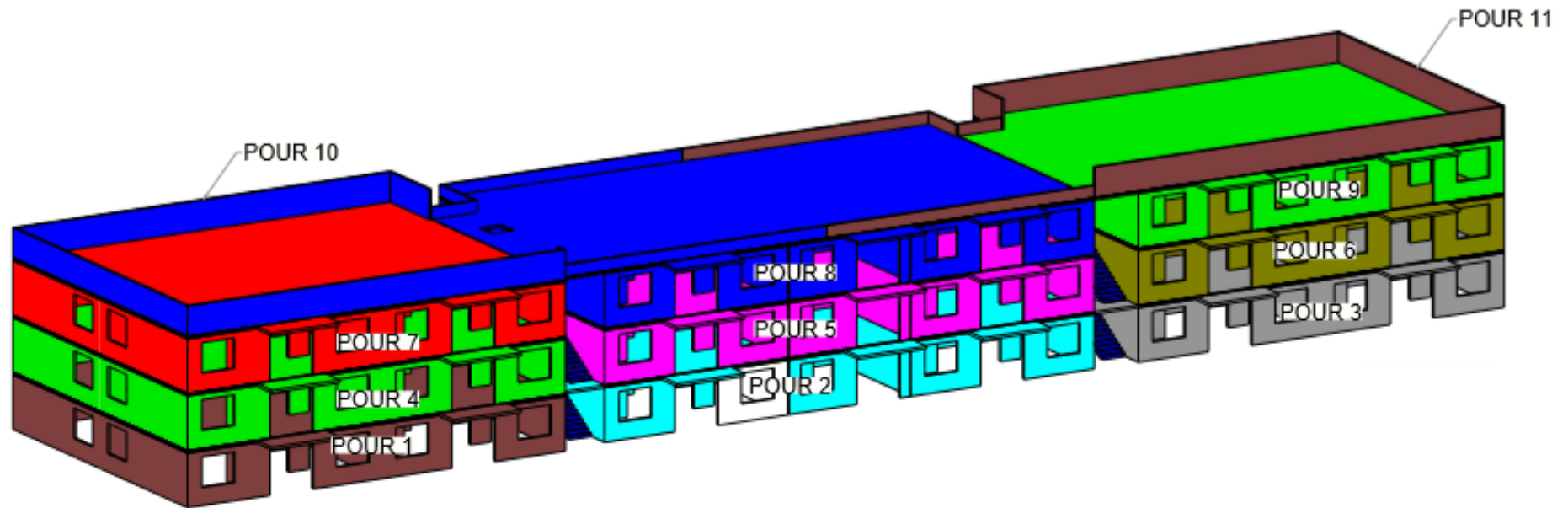
Max 22 units per week (Includes Saturdays)
16 Apartments per week average
44 Form Workers (18 Walls and 24 Ceiling and 2 Supervisors)
Max – Pour: 14392 Ft² (6 Apts) – 1337 m² Form Work
Min – Pour : 10770 Ft² (4 Apt) – 1000.6 m² Form Work
Productivity:
0.053 mh/ft² form area

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CASE STUDY

EXAMPLE SHELL CYCLE RATE



16 Units Per Floor
1 Floor Per Week (6 day work week)

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CAST IN PLACE SHELL & MATERIALS



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FORMING PROCESS



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FORM & SCAFFOLD CYCLING

WF 4D Form Scaffold
For Formwork Cycle



Cup-Lock Scaffold
or Similar

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DECK FORMS WITH SHORING



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FAMILY VILLAS

MODERN DESIGN CONSTRUCTED IN SAUDI ARABIA



Al Wrood City in Al Taif – Saudi Arabia 4000 housing Units.

- Single Family houses:
- Concrete Bearing Walls and elevated slabs poured monolithically per floor
- 4 BR with Annex 307 m2 BUA.

The project is currently designed for cast in place concrete stature. Phase one 214 villas to be completed by end of 2020. This is phase one.

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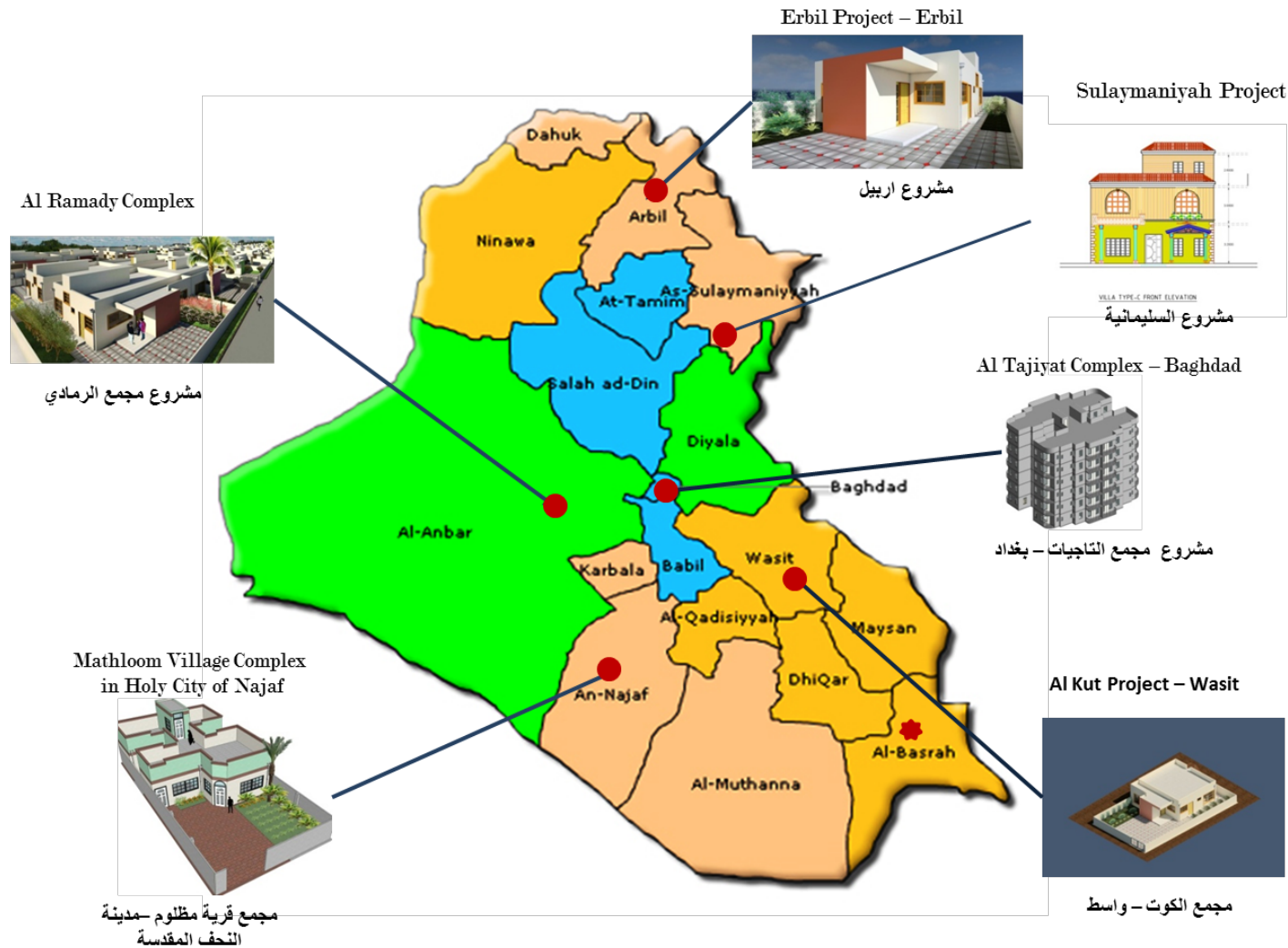
Al Wrood Project – Al Tyaif, Saudi Arabia



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Projects in Iraq



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Project Name: Al Ramadi Project
of Units: 2000 units
BUA: 140 M2



Project Name: Mathloom Village
of Units: 500 units
BUA: 100 M2

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MULTI-STORY APPLICATIONS



Mexico

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MULTI-STORY APPLICATIONS



Dominican Republic

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MULTI-STORY APPLICATIONS

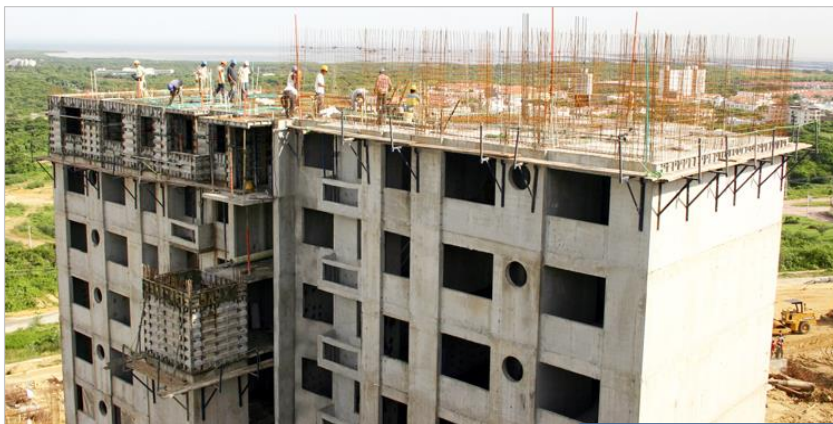


Panama

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MULTI-STORY APPLICATIONS
NO CRANES REQUIRED



Colombia

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DORMITORY PROJECT – University of West Indies



Day 1 - On-site support provided through the first month of construction

Construction became very much like a production line.

Steel prepared one floor ahead of where crew was currently working.



From unpacking of form to first pour was 3 days



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DORMITORY PROJECT – University of West Indies



Progress after 5 weeks - 3rd floor
Forms not required to complete 3rd floor were
moved up to start the 4th floor.



All formwork done without crane.

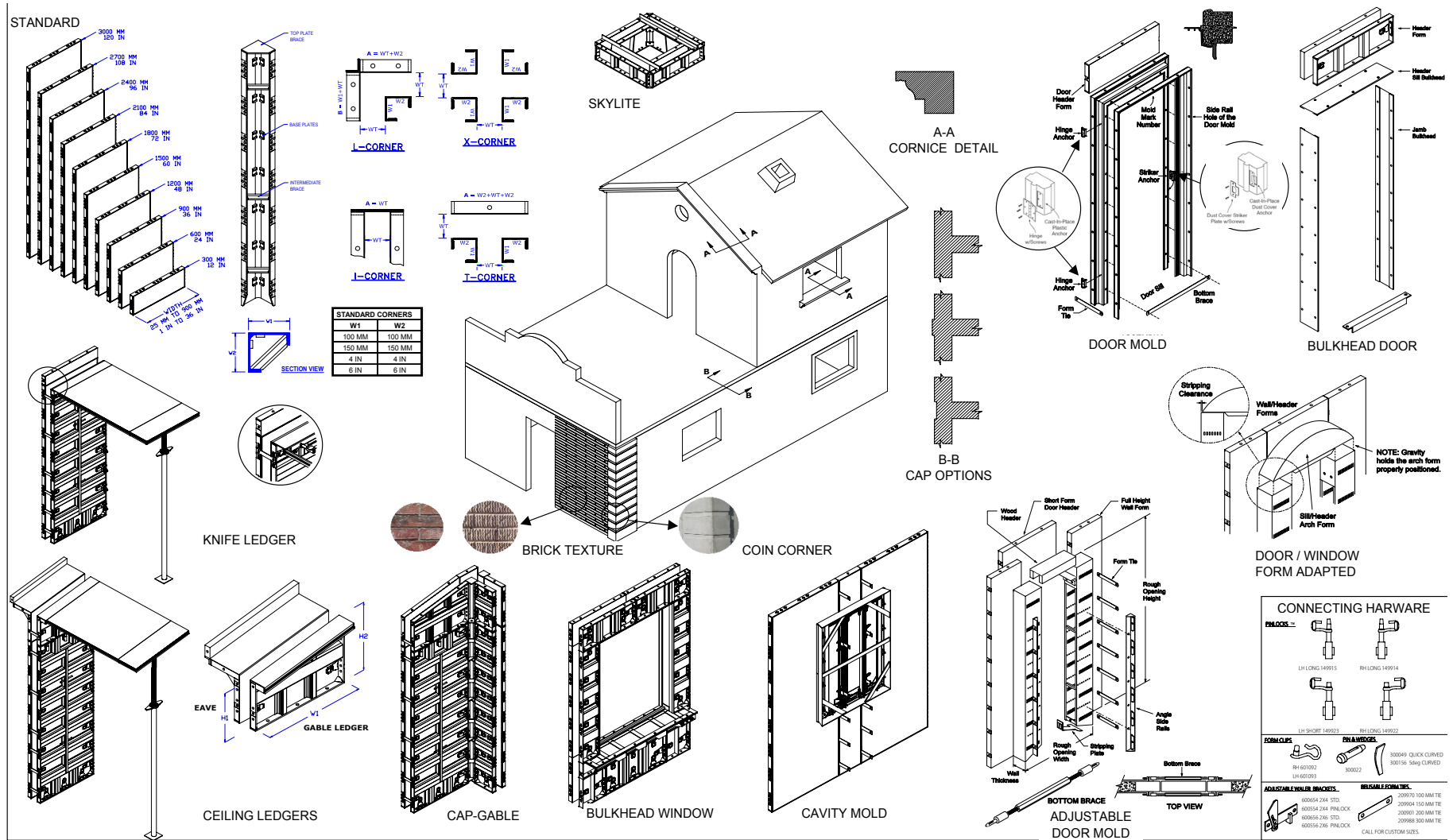
6th Floor – Week 10
Notice plastering has
already started to
minimize length of time
scaffold is required



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Hand-Set System Elements



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INTRICATE ARCHITECTURAL DETAILS
DESIGN FLEXIBILITY



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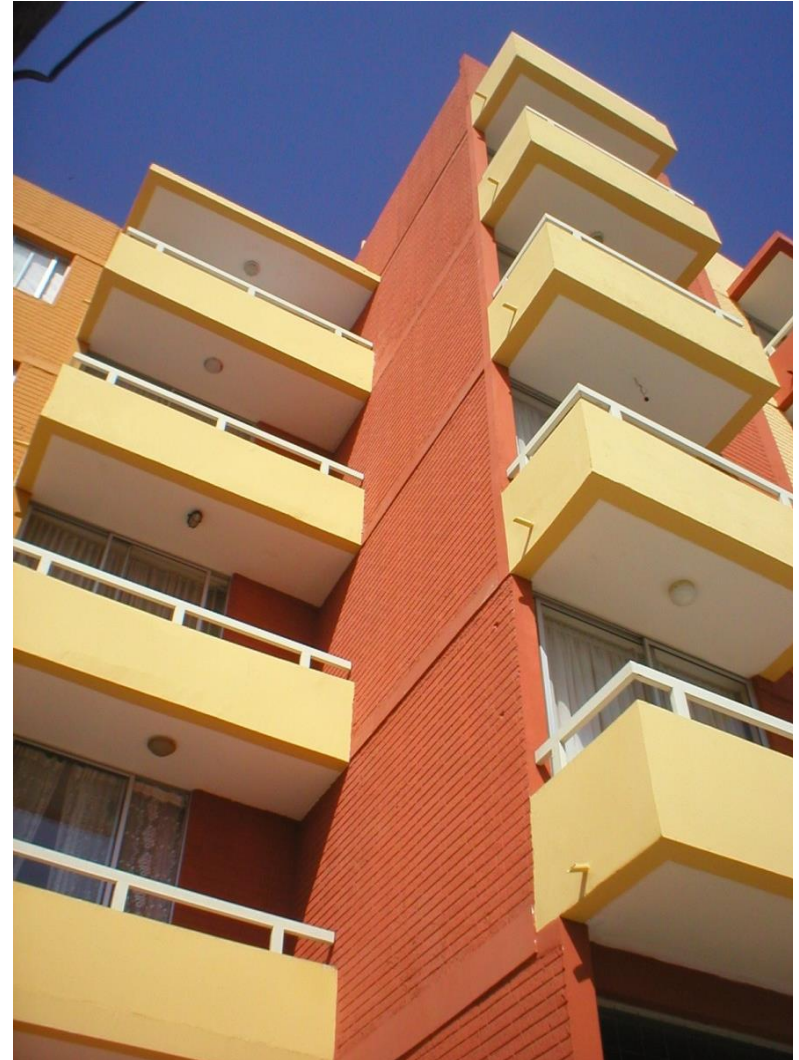
INTRICATE ARCHITECTURAL DETAILS



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TECHNE™-STRUCTURA = Flexible Design including Cantilevered Balconies
Ideal for Rapid Construction of Multi-Family High Rise Projects



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Details: Forms for Stairways Cast in Place with Exterior / Interior Walls & Floors



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CONSTRUCTION DETAILS

Installing Chase for Utilities & Structural Steel Within Insulated Walls

System Provides for R-30 Energy Efficient insulation factor in Exterior Walls and Ceiling



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STEEL, ELECTRICAL & PLUMBING IN-WALL INSTALLATION



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Fast 30 Day Shell Construction

Superior Project Management



Multi-Story Housing Units - Mexico

Successful “Green” Large-Scale Housing



Best Interior Fit Out

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ADVANTAGES OF TECHNE™-STRUCTURA SYSTEM

- **60-DAY HOME COMPLETION**
 - 30 DAY SHELL CONSTRUCTION
 - 30 DAY “INTERIOR FIT OUT”
- ENERGY EFFICIENT OPERATION
- REDUCED LABOR
- HAND-SET ALUMINUM FORMS
 - NO CRANES REQUIRED
- LOWER CONSTRUCTION COST
- STRONG QUALITY CONTROL
- ADAPTABLE “BESPOKE” DESIGNS
- INTEGRATED TECHNE™-STRUCTURA SUPPLY CHAIN MAINLY FROM GCC
 - INTERIOR AND EXTERIOR COMPONENTS



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