

# FORM MARKS®

SPRING 2020



**The Damansara-Shah Alam Elevated  
Expressway Highway (DASH) ...p 32**



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by EFCO Chairman of the Board — Al Jennings

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Covering a wide range of projects around the world.

**FORM MARKS®**  
**SPRING 2020**  
Volume 69, No. 1

*Published since 1951 for and about  
the people in the business of concrete  
construction.*



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“

*These quotes can be seen  
throughout FORM MARKS. They  
contain customer feedback given  
to EFCO Field Supervisors at the  
jobsite.*

”

The EFCO *PLATE GIRDER*® form system is a registered trademark. This product was designed for use with products manufactured by EFCO, and it is recommended that it not be commingled with products of other manufacturers' forming systems.



### SCOTT WALTER NAMED TO NAM BOARD OF DIRECTORS

The National Association of Manufacturers announced that Scott Walter, president and COO of EFCO Corp., has been named to the NAM Board of Directors. Walter will join the NAM Board to advance a manufacturing policy agenda that promotes growth and prosperity for all Americans.

Founded in 1895, the NAM, guided by its board of directors, is the largest industrial trade association in the United States with more than 14,000 members and is the nation's most influential advocate for manufacturing. The NAM's membership includes some of the world's most iconic brands and many of the small manufacturers that power the U.S. economy. Ninety percent of the NAM's members are small- and medium-sized businesses.

The NAM is at the forefront of every important policy debate for manufacturers. Executives on the NAM Board, which comprises leaders representing companies of all sizes in every industrial sector, are the driving force behind the NAM's advocacy efforts.

EFCO Corp. has been a member of the NAM since 1945.

Cathy Howell  
VP & Director of Advertising

Source:  
<https://www.nam.org/efco-scott-walter-named-to-manufacturers-association-board-of-directors-7268/>



# EFCO DELIVERS GREAT CONCRETE CONSTRUCTION RESULTS

by EFCO Chairman of the Board — Al Jennings

## WITH WORLDWIDE CONTINUOUS IMPROVEMENTS, EFCO IS BETTER AND BETTER EVERY DAY

EFCO is a company built on innovation and invention opportunities for concrete construction process improvements.

It all starts with EFCO company employees, territory manager representatives, not even a dealer or distributor, listening to and working with our customers. This is where and how EFCO got its start some 85 years ago (1936), and it just keeps going and going, better and better. Can you believe it? The company EFCO has a foundation of engineering graduates now working in its fourth generation, always working with new technologies to leverage more

successes for our construction contractor customers. This work for the concrete construction industry has included stronger and better concrete mixes and, of course, stronger reinforcing concrete structures.

With EFCO all-steel forms, there can be many, many possible additional benefits. With standard and special EFCO steel forms, we can deliver many shapes and sizes of architectural concrete configurations.

The single-line EFCO form joints alone versus some competitors' three-line depressed form joints, it is reason enough to go EFCO.



*Double-branched freeway overlapping sections of I-80 and I-29, Council Bluffs, Iowa*



*Lowery Avenue Bridge, Minneapolis, Minnesota*



*Pinellas Bayway Bridge, St. Petersburg, Florida*



*Myrtle Woldson Performing Arts Center, Spokane, Washington*



*Crimson Tide Stadium Expansion, Tuscaloosa, Alabama*



*Roberto Garza Sada Center, Monterrey, Mexico*



*Fertilizer Facility, Madelia, Minnesota*

## WRAP-AROUND EFCO SUPPORT

These are all wonderful EFCO attributes and not to be forgotten but combined with EFCO's core value attributes with the abbreviations: Q-I-I-S for:

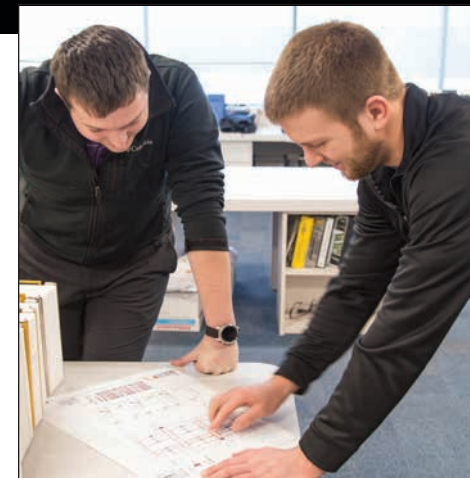
### Quality – Innovation – Integrity and Super Service

Having a very successful EFCO foundation of successes with our excellent products is not enough. Our continuing successes depend upon our continuing corporate heritage of Q-I-I-S given to us by our founder, W. A. Jennings. As an example for **quality**, of course, we take real pride in the quality of our products as we have had years of experience in the business. It is also quality in everything we do and touch including, as an example, engineering and field service. We are just plain quality people, honest and straight forward employees.

As for EFCO's **innovation**, our company being vertically integrated from design, invention, manufacturing, distribution and sales, we are very flexible. As I remember our founder would say, "Can't never did anything," and, of course, innovation has led to new inventions. In the early days, our founder would keep us from showing at trade shows as he would say, "Our competitors will just try to copy us."

As for **integrity**, we are financially stable and employee-owned. We are also committed to balancing the interests of our customers, employees and stockholders and make a promise to our customers to under-promise and over-deliver.

Now for **super service**, we have the best engineering and field service in the industry supported by our warehousing and distribution systems.



*EFCO engineers deliver solutions for safe formwork and support systems. This work includes project specific form erection drawings.*



*Assembly, cycle and safety—it's all about EFCO field service.*

## EFCO CUSTOMER CONSTRUCTION CONTRACTS

EFCO's customer contracts for rental and sales equipment are only direct from construction contractors, very seldom government. The contact is only normally worked face to face with EFCO's territory manager (TM). EFCO's TMs are each backed up by wrap-around support teams, including a Customers Solutions consultant, field supervisor, engineer and drafters, sales administrator, and warehouse plant manager, you name it.

With an ongoing contracted construction project with EFCO equipment, a contractor can be connected with a direct linkage to EFCO field service, engineering,

*Continued on page 6...*

...Continued from page 5

warehouse management, and or a district sales administrator. EFCO super service is the name of the game. As EFCO works in a number of countries and districts in a country, the local EFCO district management takes over.

Internal to EFCO and EFCO products, when you are working with EFCO, there is a whole lot more. The total executive management team of eight brings us all together—working with sales, engineering, field service, manufacturing, manufacturing management, HR, financials, IT, you name it—all on the “wrap-around support team” working together.

## EFCO EMPLOYEE- AND FAMILY-OWNED

Through an EFCO history of 85 years working to support concrete construction contractors’ successes, just where and how did EFCO come about as it is qualified as an employee- and family-owned business? First of all, the name “EFCO” is short for Economy Forms Company and later corporation. The word “economy” may have even been a little misnomer as EFCO is by far only “the best brand.”

To support “The Legacy of EFCO from One Generation to the Next,” now for our FORM MARKS publication readers, let’s share a little bit of history.



1918



1934



1974

W. A. Jennings  
EFCO Founder

## EFCO HISTORY

Our W. A. Jennings, founder of EFCO ancestry, migrated to the USA from Western Europe in the early 1800s. W. A.’s wife, my mother, Lillian Witt’s, ancestry migrated from Eastern Germany around 1900. By the way, I was born during the Great Depression in 1934 and as joke, I am just half a Witt, get it? Lillian Witt had a younger brother, Wilson Witt, who came to EFCO as an Iowa State University graduate as one of EFCO’s first employees and later served as a very important vice president of sales.



Wilson Witt, one of  
EFCO’s first employees

Now for W. A. Jennings, he was only about two years old when he lost his father in an accident in 1900. W. A. went on to work his way through Iowa State University for a civil engineering degree working nights shoveling coal in a greenhouse west of campus. Following graduation, W. A. had several civil engineering jobs and was later working for a company, Capitol Steel & Iron in Oklahoma City, in the midst of the Great Depression in 1929. I am told that is when the owner of Capitol Steel & Iron took his own life. This automatically sent W. A., with his family, back to Des Moines, Iowa to live with his mother in her home. What can you do now with no money and no job?

Back in Des Moines, W. A. went to work for a company called Metaforms, working out of Milwaukee, Wisconsin with a job selling Metaforms with an Iowa/Nebraska territory. Yes, a company still in business today doing great work.



W. A. Jennings  
sold formwork  
for Metaforms  
before starting  
Economy  
Forms.

W. A., being an engineer, an innovator, an inventor and a good salesman, had some good ideas for Metaforms that did not sell well to the president of Metaforms, so W. A. decided to do it himself and so here we are today, EFCO!

By Al Jennings,  
EFCO Chairman of the Board



One of W. A. Jennings’ early jobs as a civil engineer was at Capitol Steel & Iron in Oklahoma City

## EFCO CHARACTERISTICS AS A COMPANY

- Employee- and family-owned
- Original Chain of Original Ownership
- Employees with Knowledge and a Passion
- Conservative
- Financial Stability
- A “Can Do EFCO Attitude”
- Balancing the Interests of Customers, Employees, and Stockholders
- Controlling Our Own EFCO Destiny
- Under Promise, Over Deliver
- Vertically Integrated Company Functions
- Our EFCO Company Creed: Listen– Discuss – Decide – Support
- All Starts with the First Customer Visit and Listening

## EFCO ATTRIBUTES

- Engineering Solutions
- Customer Service
- Field Service
- Product Availability
- Record of Performance – Over 85 Successful Years
- Labor Savings
- Reputation
- Experience
- One-of-a-Kind Labor-Saving Products
- Architectural Concrete Quality
- Projects Completed Ahead of Schedule



# EFCO DELIVERS GREAT CONCRETE CONSTRUCTION RESULTS



*Delphi Township Digestive System, Holt, Michigan*



*The Great Taipei Pylon, Taipei, Taiwan*



*Manufacturing Facility, Mount Pleasant, Tennessee*



*Harry Tracy Water Treatment Plant, San Bruno, California*



*Hotel at Southport, Renton, Washington*



*Bridge Over the Tennessee River, Lenoir City, Tennessee*



*I-91 Bridge Replacement Windsor, Vermont*



*John Turk Power Plant, Fulton, Arkansas*



*Freeway Bridge, Council Bluffs, Iowa*



*Boarder West Expressway, El Paso, Texas*



*City of Knowledge Mall, Panama City, Panama*



*Wachovia Headquarters, Charlotte, NC*



*O'Hare Air Traffic Control Tower, Chicago, Illinois*



*Bridge Over Ariari River, Puerto Llerasm, Colombia*



*Bridge Over the Missouri River, St. Louis, Missouri*



*Murray Baker Bridge, Peoria, Illinois*



*Dapeng Pylon Bridge, Pingdong, Taiwan*



*I-35W Bridge Reconstruction, Minneapolis, MN*



*IB Tower, Kuala Lumpur, Malaysia*



*Fertilizer Storage Plant, Kenyon, MN*



*Ritz-Carlton Residences, Waikiki, HI*

**QUALITY • INNOVATION • INVENTIONS  
• INTEGRITY • SUPER SERVICE**



# EFCO DELIVERS GREAT CONCRETE CONSTRUCTION RESULTS



*St. Michael's Abbey Bell Tower,  
Silverado Canyon, California*



*I-64 Daniel Boone Bridge,  
Mississippi*



*LAX Transit Corridor,  
Los Angeles, California*



*Digester Tanks,  
Rosendale, Wisconsin*



*Water Treatment Facility,  
Brewster, Washington*



*Red Highway Improvement  
Project, Wichita, Kansas*



*47-story Apartment Tower,  
Chicago, Illinois*



*Leckford Mushroom Estate,  
Winchester, England*



*Underground Storage Basin,  
Louisville, Kentucky*



*Central Park Corporate Tower,  
Guadalajara, Mexico*



*Auto Parts Facility,  
Johor Bahru, Malaysia*



*Convention Center,  
San Diego, California*



*Cyberjaya Hospital,  
Cyberjaya, Malaysia*



*The Bayshore Hotel,  
Myrtle Beach, South Carolina*



*The Port Access Road,  
Charleston, South Carolina*



*Northampton Bridge,  
Northampton County, PA*



*Box Culvert,  
Canning, Argentina*



*Parking Garage,  
Nashville, Tennessee*



*Blackman Water Treatment Plant,  
Springfield, Missouri*



*UNACEM Cement Clinker  
Plant, Tarma City, Peru*



*Line 2 of the Panama Metro,  
Panama City, Panama*



*LAX Transit Corridor,  
Los Angeles, California*

**MAKE IT CIVIL OR MAKE IT  
COMMERICAL, EFCO CAN DO IT!**



# EFCO DELIVERS GREAT CONCRETE CONSTRUCTION RESULTS



*Project: Granville III,  
Davao City, Philippines*



*Estanque Padre Hurtado,  
Padre Hurtado, Chile*



*Foundation Wall,  
Ames, Iowa*



*Cyberjaya Hospital  
Cyberjaya, Malaysia*



*Swimming Pool,  
Des Moines, Iowa*



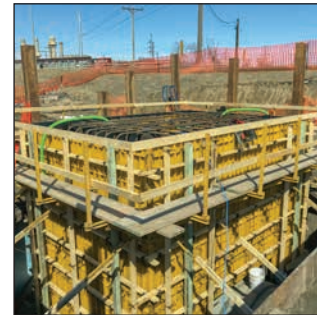
*Pilmico Foods Corp.,  
Iligan City, Philippines*



*Garage Foundation,  
Voluntown, Connecticut*



*Alcalde Godoy Swimming Pool,  
Iquique, Chile*



*Outflow Structures,  
Omaha, Nebraska*



*Extensión Metro Línea 2,  
Comuna San Bernardo, Chile*



*St. Paul College,  
St. Paul, Minnesota*



*Box Culvert,  
Kihei, Maui, Hawaii*



*999 17th St. Office Building,  
Denver, Colorado*



*Trio at Stuart Creek Phase 3,  
Canmore, Alberta*



*Waste Water Treatment Plant,  
Ames, Iowa*



*Casas Vespucio Norte,  
Comuna de Huechuraba, Chile*



*Deca Homes Ormoc  
Ormoc City, Philippines*



*Cinco Saltos Water Treatment  
Plant, Cinco Saltos, Argentina*



*Northeast Boundary Tunnel  
Washington, D.C.*



*Pump Station Benavidez,  
Buenos Aires, Argentina*



*Estadio Tierra De Campeones,  
Iquique, Chile*



*Cinco Saltos Water Treatment  
Plant, Cinco Saltos, Neuquen, Argentina*

**EFCO STEEL FORMS, STANDARD AND  
SPECIAL, WITH A SINGLE-LINE JOINT**



# EFCO DELIVERS GREAT CONCRETE CONSTRUCTION RESULTS



*Pump Station Benavidez, Buenos Aires, Argentina*



*Canton Water Reclamation Facility, Canton, Georgia*



*Floresta Sur IV Tower, Chirrillos, Lima, Peru*



*Cerro Viento Bridge, Panama City, Panama*



*Starbucks Coffee, Monmouth Junction, New Jersey*



*Box Culvert, Columbus Junction, Iowa*

**IF YOU NEED IT, EFCO CAN FORM  
IT WITH HAND-E-FORMS!**





# I-35 INTERCHANGE EXPANSION

Austin, Texas

## PROJECT TO RELIEVE TRAFFIC CONGESTION

J. D. Abrams, L.P. of Austin, Texas is working on a complex I-35 interchange expansion on one of the most congested stretches of interstate in the entire country, with more than 175,000 cars traveling on the roads every day. The sheer volume of traffic congestion, along with the geometry of the columns and caps, required unique forming solutions and a strong collaboration between EFCO and J. D. Abrams. Once completed, this project will relieve traffic congestion by adding three new direct connectors and reconfiguring an existing entrance ramp into a more efficient braided ramp.

## COLUMNS

The geometry of the columns on this project, specifically the large columns which are octagon-shaped with a flared column capital at the top, posed two different issues: first, EFCO had to design stripping relief into the forms to get the capital forms stripped. Second, EFCO had to design and build oversized **SB-4 Support Brackets** that could reach out beyond the capital to the soffit beams. Each oversized SB-4 Support Bracket measures 6' (1.6 m) tall and weighs 1,000 lb (450 kg)!

## CAPS

The caps on this project also posed a unique challenge because they were narrower than the top of the column capital. Since there was no way to carry cap loads through the cap side forms and support them on the top of capital, EFCO designed a spanning beam set-up using face-to-face **PLATE GIRDERS**®, Tension/Compression forms and **SUPER STUDS**®. This design allowed J. D. Abrams to span long distances while also maintaining minimum roadway clearances for passing traffic below.



*Each oversized SB-4 Support Bracket measures 6' (1.6 m) tall and weighs 1,000 lb (450 kg).*

Due to traffic congestion, most of the caps on this project had to be constructed, poured and cycled at night, during nightly road closures. Formwork had to be designed such that it could carry concrete loads and form the concrete but also be stripped efficiently during an 8-hour road closure (5-hour actual work window once the cranes are mobilized into work area). In some cases, EFCO had to design a system that would allow the contractor to hang large sections of soffit forms from the top of the recently poured cap using **SUPER STUDS** and all-thread

because stripping the entire soffit was not possible during a single nightly closure.

## ACCESS

Single-column caps on this project often extended out over live traffic where shore towers were not possible to support the unbalanced load. In order to pour the caps while maintaining traffic flow, EFCO designed a balanced soffit that was, supported on column-mounted brackets and a 100K (444 kN) shore tower on the skinny side of the cap. The contractor then preloaded

“

*This is a challenging project, not only because of the overall size and complexity of the structures, but also because of the limited work access in the highly congested I-35 corridor. EFCO worked with our engineers and superintendents to design column and cap forms that worked within each location's constraints and our equipment's restrictions. These efficient designs allowed us to form and strip within the limited work areas with minimum lane closures.*

*Julian Summers, Project Manager*

”

the 100K (444 kN) shore tower with precast concrete blocks equal to the weight of the unbalanced load plus a 1.5:1 factor of safety on the overturning moment. ◇

Steven Zbranek ..... Central Texas Area Manager  
Julian Summers ..... Project Manager  
Steve Clementino ..... Project Superintendent  
Garrett Gregg ..... Structures Engineer  
Abraham Longoria ..... Structures Superintendent  
Paul Drey ..... EFCO Territory Manager  
Nick Mojica ..... EFCO Engineer





# A LEASABLE SOLUTION FOR EVERY SITUATION

Chicago, Illinois

## RIVERVIEW BRIDGE PROJECT

ICC Group, Inc. has completed construction on the US\$16.6 million Riverview Bridge in Chicago, Illinois which connects a large gap in the Chicago 312 River Run. The curvy pedestrian bridge is over 1,000' (305 m) long and 16' (5 m) wide with some points elevated more than 18' (5.5 m) and a portion of the bridge being built under an existing four-lane bridge. The Riverview Bridge will help both commuter traffic and pedestrians by allowing walking and biking traffic to entirely avoid two busy cross streets and cross the Chicago River.

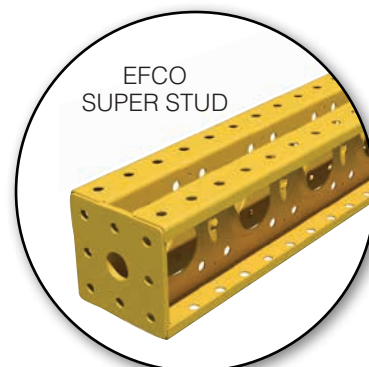
## EFCO ENGINEERS DELIVER SOLUTIONS

The Riverview Bridge's design and location made for a long list of unique challenges on this project. ICC approached EFCO with the challenge of providing a leasable solution knowing that EFCO had the engineering experience to deliver. The core of the design solution was the 16' (5 m) wide wing-shaped deck. EFCO was able to build custom-shaped tubs out of leasable **SUPER STUDS®** and **E-BEAMS®** that could be adjusted to handle the curve, camber and bank of the bridge. The deck tubs could also be quickly cycled in large gangs from one span to another reducing the amount of labor required to set the deck. To support the SUPER STUD and E-BEAM deck, EFCO used its versatile **PLATE GIRDER®** forms as beams that can handle large spans with minimal deflection. The largest span was 110' (33.5 m) long, included a large curve, and at 16' (5 m) wide produced some massive loads. To support

these large loads, EFCO provided shore towers with a maximum capacity of 50K (222 kN) per leg that could wrap around the columns. The columns were poured using EFCO's steel faced **Round Columns®**, and the custom-shaped crowns were poured using EFCO's **PLATE GIRDER** and support brackets.

With a lot of group collaboration and teamwork between ICC and EFCO, EFCO was able to provide numerous solutions using a wide variety of our leasable inventory to complete a difficult project. ♦

Adam Tarmann ..... Project Manager  
 Matt Eichen ..... Project Manager  
 Joben Grimmus ..... EFCO Territory Manager  
 Paul Huisinga ..... EFCO Sr. Field Supervisor  
 Adam Bracken ..... EFCO Engineer



*The modular **SUPER STUD®**'s hole spacing provides for a multitude of uses and connections while reducing costly on-site modifications.*



*EFCO was able to build custom-shaped tubs out of **SUPER STUDS®** and **E-BEAMS®** that could be adjusted to handle the curve, camber and bank of the bridge.*



*Multiple EFCO systems—**SUPER STUDS** and **E-BEAMS**, **PLATE GIRDER**, **E-Z DECK** Shoring, 50k Shoring, and friction collars—working together to provide a leasable solution.*





# TALLEST BRIDGE IN KENTUCKY

Pike County, Kentucky

## US 460 BRIDGE OVER POND CREEK

The new US 460 Bridge over Pond Creek in Pike County, Kentucky will be the tallest bridge in the state of Kentucky when completed at over 300' (91.5 m) tall. After going through a redesign from a tapered hollow core stem to an H-Shaped stem design, **Bush and Burchett** asked the EFCO Columbus team to work with them on developing a forming solution for this project. Working with Paul Burchett, EFCO designed a forming system using EFCO **PLATE GIRDER®** and the EFCO **GUIDED RAIL SYSTEM®** to pour typical 24' (7.2 m) tall stem lifts utilizing 28' (8.5 m) of form to accommodate rebar. This forming system provided Bush and Burchett with a work deck, which created access around the entire pier stem set up. During stripping and cycling, the forming system utilized hinges to accommodate interior stripping relief, and bulkhead panels were also hinged enabling all components of the forming system to stay intact during cycling.

## TALLEST PIER MEASURES 296' (90 m)

EFCO furnished two pier stem set-ups to form the eastbound and westbound piers simultaneously. The on-site crew is cycling the forms weekly while also tying the rebar cages.

There are six piers on the project, the tallest being 296' (90 m) tall to the bottom of the pier cap. The overall dimensions of the H-shaped pier stems are 16' (5 m) x 20' (6 m) on the lower lifts, reducing to 16' (5 m) x 8' (2.4 m) on the top lifts. The pier stem section reduced in 4' (1.2 m) increments after each 72' (22 m) increment in stem height; 2' (600 mm) sections of formwork were removed to accommodate these dimensional requirements as the pier stems grew taller.

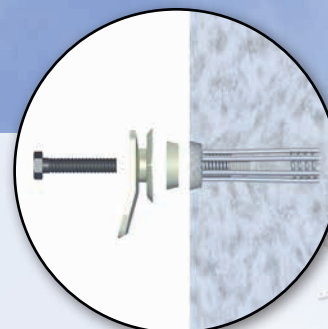
Bush and Burchett are nearing completion of the first pair of pier stems and are very pleased with the performance of this EFCO forming system. ◇

Joe Burchett ..... President  
Paul Burchett ..... Project Manager  
Bill Ward ..... Project Superintendent  
Ric Klinedinst.. EFCO Sr. Territory Manager  
Brian Jenne ..... EFCO Field Supervisor  
Dan Burns ..... EFCO Engineer

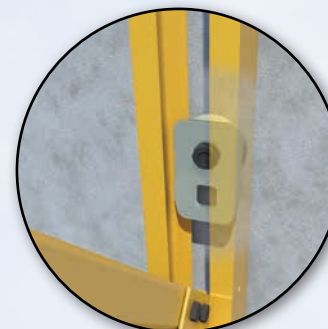


ANCHOR SHOE

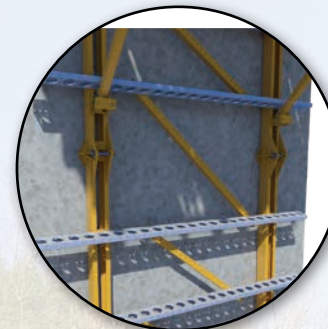
**The GUIDED RAIL SYSTEM Anchor Shoe** secures the system to the wall at all times, which allows the system to be crane picked safely even in windy conditions.



ANCHOR SHOE AND ANCHOR



ANCHOR SHOE WITHIN GUIDED RAIL



GUIDE RAILS

**The EFCO GUIDED RAIL SYSTEM®** climbs the wall on a pair of high-strength, steel rails which support the all-in-one form panel and working platform.





# TRANSFORM 66—OUTSIDE THE BELTWAY

Northern Virginia

## TRANSPORTATION IMPROVEMENTS

Transform 66—Outside the Beltway is a large P3 project that will deliver US\$3.7 billion worth of transportation improvements to the I-66 corridor in Northern Virginia. FAM Construction, LLC (joint venture company between Ferrovial Agroman and Allan Myers) has been selected as the design-build contractor and is responsible for providing 22.5 miles (35 km) of new express lanes and interchange improvements to the I-66 corridor from University Blvd. to I-495. Indus Road & Bridge, Inc., based in Houston, Texas, has been contracted to build several parts of the project including bridges and retaining walls.

## PLATE GIRDER VERSATILITY

Indus has a history of using the EFCO **PLATE GIRDER**® system on past bridge projects. Due to the versatility of the **PLATE GIRDER** system, Indus is using it to build several different styles of pier walls, columns and caps, including hammerhead caps and battered pier walls. The project is being constructed near the busy I-495 Beltway and I-66 with many space limitations. Working together with EFCO, Indus has been able to meet and exceed the challenges of the project. ♦

Frank Loza ..... Project Manager  
Brett Anglin ..... Project Engineer  
Pedro Martinez..... Technical Director  
Kevin Pyle..... EFCO Territory Manager  
Rick Lynch..... EFCO Field Supervisor  
David Thibau..... EFCO Engineer



*The all-steel, precision built **PLATE GIRDER**® panels have been designed to be interchangeable with a common bolting pattern, allowing many configurations.*





# IMPROVING TRAFFIC FLOW

Pinellas County, Florida

## REPLACEMENT OF OLD BRIDGE

State Road 679 in Pinellas County, Florida connects Isla del Sol with the island of Tierra Verde that is home to Fort DeSoto State Park. The beaches at Fort DeSoto State Park have been recognized as some of the best beaches in the United States. That distinction attracts numerous visitors that often lead to very heavy vehicle congestion. This is compounded by the low level, two-lane draw bridge that connects the two islands and opens two times per hour throughout the day. To mitigate this, the Florida Department of Transportation released a Design Build Bid Project to provide a fixed, high-level bridge to replace the current 60-year-old design along with improved traffic patterns and pedestrian access. **American Bridge Company (AB)** provided the winning Phase I and Phase II combined score and was awarded the US\$56M project.

## PROVIDING THE LOWEST IN-PLACE CONCRETE

EFCO began working with AB early in the pre-bidding process on multiple facets of the substructure design to aid in providing the lowest in-place concrete costs for their winning bid. Upon award, the AB and EFCO Teams worked together to put a full substructure formwork package in place to include land-based and water-based footings, columns, and cap forms.

AB chose EFCO's versatile **PLATE GIRDER®** forms for all three elements of the project. With rectangular-shaped, land-based and bullnose-shaped water-based footers, EFCO provided standard and custom **PLATE GIRDER** formwork. The bullnose-shaped, water-based footer design utilized a seal slab system that the **PLATE GIRDER®** formwork was attached to. EFCO provided the formwork solution,

*Continued on page 26...*







...Continued from page 24

and McNary Bergeron and Associates designed the seal slab to be connected prior to setting it in the water and minimized the need for specialty divers post-pour to remove the forms from the seal slab.

### COLUMNS

With two different sized columns, 12' (3600 mm) x 6' (1800 mm) and 10' (3000 mm) x 6' (1800 mm), up to 43' (13 m) tall in a single lift pour, AB chose the EFCO tieless *PLATE GIRDER* column forms. Due to schedule needs, the 10' (3000 mm) x 6' (1800 mm) land-based columns were poured first, which allowed AB to swap out the 10' (3000 mm) faces with 12' (3600 mm) faces and seamlessly transition to the larger size column pours.

### CAPS

The single stem, radial soffit caps, measuring up to 64'-6" (20 m) long x 6' (1800 mm) wide x almost 32' (9.8 m), were also formed using EFCO's *PLATE GIRDER* forms. Due to the large size of the caps, the reinforcing congestion and bar sizes inside the columns, EFCO also needed to design custom cap support solutions that enabled AB personnel flexibility when installing support tubes in the columns.

EFCO is very proud to once again work with American Bridge Company's SR679 Pinellas Bayway Structure E Team. A great group of personnel combined with an outstanding design is going to provide Pinellas County with a beautiful structure for years to come. ♦

Jonathan Yates ..... Project Manager  
Mike Banfield ..... Project Superintendent  
Kevin Glass ..... Sr. Project Engineer  
Diego Laris ..... Project Engineer  
Tim Lindstedt... Structures Superintendent  
Tim Davis, PE.... Precast Seal Slab Specialty Engineer—McNary Bergeron & Associates  
Jim Cannan..... EFCO Sr. Territory Manager  
Frank Bonventre ..... EFCO Sr. Field Service  
Dustin Miller ..... EFCO Engineer

“

*Working with Jim and his team through the project formwork challenges ultimately resulted in a very successful project and forming system. EFCO's ability to work closely with AB's engineering staff and specialty engineers, as well as the project's EOR, all facilitated in the success of the substructure construction, leaving the owner with a high-quality and great looking finished product.*

Jonathan Yates  
Project Manager

”



*For the columns, AB chose the EFCO tieless **PLATE GIRDER** column forms.*



*The bullnose-shaped, water-based footer design utilized a seal slab system that connected to the formwork prior to being set in the water. This minimized the need for specialty divers post-pour to remove the forms from the seal slab.*





# MULATOS TUNNEL

Bolombolo, Antioquia, Colombia

## CONNECTING ANTIOQUIA AND ITS CAPITAL MEDELLIN CITY

As part of the 4<sup>th</sup> generation highways currently being built in Colombia, the Mulatos Tunnel is a portion of highway called Pacifico 2, which will connect the Department of Antioquia with the Coffee Triangle and the southwest of the country. With a length of 1.5 miles (2.4 km). and two vehicular passages, it constitutes a milestone of Colombian engineering. Its location, in the rocky massif between the Mulatos and the Cauca Rivers, makes it the most critical segment of the project. The tunnel lining was awarded to **Consorcio Suroeste**, formed by two large construction companies in Colombia: Latinco S.A. and Estyma S.A., with more than 50 years of combined experience in civil works.

## THE BEST RENTABLE SOLUTION: REDI-RADIUS AND SUPER STUD

Consorcio Suroeste chose EFCO to supply two, 29'-6" (9 m) travelers to add to the in-progress lining works. The travelers were constructed of all leasable components and capable of building approximately 2,300' (700 m) of tunnel lining each, with an uninterrupted high production rate.

When looking for a formwork supplier, they wanted a company that could deliver a solution quickly, provide supervision on site for assembly and cycling activities and offer formwork that produced an excellent concrete finish. These were important factors to consider when choosing a supplier.

*Continued on page 30...*



*To adjust to the geometry of the tunnel, both JUNIOR and SENIOR REDI-RADIUS® forms were placed on top of the frames made of SUPER STUDS®.*





...Continued from page 28

The solution was a combination of EFCO **SUPER STUDS**® and **REDI-RADIUS**® forms. To adjust to the geometry of the tunnel with its different slopes of up to 7.4%, both **JUNIOR** and **SENIOR REDI-RADIUS**® forms were placed on top of the frames made of **SUPER STUDS**®. Hillman rollers, placed on the bottom of the frames, made them into movable travelers capable of rotating 360 degrees to traverse the tunnel rail. The all-steel face sheets provided the required concrete finish.

#### ALLOWANCE FOR SITE TRAFFIC

At the same time the tunnel lining was carried out, other critical activities of the project had to follow their normal course within the tunnel. For this reason, EFCO designed the travelers not only to support the formwork weight and the concrete loads, but also to provide an open clearance that allowed trucks and machinery to go through the tunnel.

#### TRAINING AT THE JOBSITE

This project was the first time the contractor worked with the **REDI-RADIUS** formwork system. EFCO field service worked closely with the crew to teach them how to assemble and cycle the forming equipment. This on-site training proved to be of value to the project with respect to productivity and safety. The crew was able to cycle the traveler every 18 hours.

#### ADAPTABILITY OF EFCO SYSTEMS

Because of the versatility of **SUPER STUDS** and **REDI-RADIUS**, the contractor reused much of the same equipment for the connection tunnels once the road tunnel work was complete, taking full advantage of EFCO systems and the engineering service. ◇

Edgar Parra.....Project Director  
Diego Ospina.....Project Engineer  
Pedro Jaimes.....EFCO Territory Manager  
Mario Gallo.....EFCO Field Supervisor  
Mario Gabrielli.....EFCO Engineer



*The **SUPER STUD** and its standard leasable accessories combine to form a traveling frame and also provide space for vehicle traffic.*

“

*My satisfaction and gratitude to the EFCO team because they have been a great support.*

**Edgar Parra**  
Project Director

”





# PORTAL AND SPINE BEAMS

Damansara Perdana, Malaysia

## PART OF A LARGE PROJECT

The Damansara-Shah Alam Elevated Expressway Highway (DASH) in Klang Valley, Selangor, Malaysia is being constructed as an effort to reduce traffic congestion. The 12.5 mile (20.1 km), three-lane, dual carriageway expressway starts at the Puncak Perdana U10 Shah Alam intersection and will end at the Penchala interchange, linking road users to LDP and SPRINT highways. There are 12 interchanges built along the alignment. The proposed expressway is expected to support rapid development along the alignment covering U10 Shah Alam, Subang, Kota Damansara and Damansara areas.

The expressway will become an alternative route for Persiaran Surian at Kota Damansara and solve traffic congestion to the existing routes caused by recent development in the area and with an expected increase in population.

## PACKAGE CB3 - PORTAL BEAM AND SPINE BEAM PROJECT

One of the awarded contractors for the DASH Highway Project was **China Communications Construction Company (M) Sdn. Bhd.** EFCO was selected by them to provide a solution on Package CB3 - Portal Beam and Spine Beam Project. The project duration was estimated for one year, with a target completion of January 2020.

## PORTAL BEAMS

Package CB3 of the DASH Highway is located in Mutiara Damansara, southwest of Kuala Lumpur, Malaysia. This section

extends the Surian Interchange, including all of the ramps. Package CB3 DASH Highway Project included construction of viaducts on the existing roads with a length of 1.2 mile (1.9 km) and a branch length of approximately 1,300' (400 m). EFCO Malaysia was involved in forming the inverted t-shaped portal beams measuring 10'-8" (3.25 m)W x 11'-6" (3.5 m)D. The beams varied in length from 98'-6" to 149' (30 m to 45.4 m) and were situated over live traffic at the mid span.

The EFCO **PLATE GIRDER**® system and its unique self-spanning characteristics enabled the China Communications Construction Company to pour concrete for the portal beams without shoring and with little or no disruption to the existing traffic flow underneath. Additionally, the EFCO **PLATE GIRDER** system comes in modular lengths and widths that can easily be connected. This gave them the flexibility of configuring them into many different sizes, as needed for the portal beams.

## SPINE BEAMS

EFCO Malaysia also supplied the **EZ-DECK**® system to shore the Spine Beam at 26'-7" (8.1 m)W x 6' (1.8 m)D and 65'-8" (20 m) shoring heights for a total of 197' (60 m)L. ♦

David Ding Dawei ..... Project Manager  
Chen Yun Feng ..... Contract Manager  
Allen Hu ..... Project Superintendent  
Darren Chow ..... EFCO Territory Manager  
Foo Ming Huang ..... EFCO Field Supervisor  
Stephen Koon ..... EFCO Engineer



*The EFCO **PLATE GIRDER**® system is capable of being bolted together into large spans, large enough for lanes of traffic to flow underneath.*

*EFCO Malaysia also supplied the **EZ-DECK**® system to shore the Spine Beam at 26'-7" (8.1 m) W x 6' (1.8 m) D and 65'-8" (20 m) shoring heights for a total of 197' (60 m) L.*







# A'ALI'I TOWER

Honolulu, Hawaii

## 42-STORY TOWER

The Kaka'ako area of Honolulu is growing with the help of Howard Hughes' master plan community, Ward Village. A'ali'i is the fifth tower in a long list of projects that include residential condos, affordable housing, community stores, restaurants, offices and outdoor living spaces. The development is designed to provide people with the perfect mix of island living in an urban environment.

In early 2019, Howard Hughes Corporation awarded General Contractor, Albert C. Kobayashi, Inc. (ACK) of Waipahu, Hawaii, the contract to build A'ali'i. With a large podium retail space, eight levels of parking garage and a 42-story tower to construct, ACK knew that they had a full workload and looked to **McClone Construction Company** as their concrete forming and shoring partner to help build A'ali'i.

## EFFICIENT AT FORMING CORES

With such a large project footprint and an aggressive weekly schedule, crane time was going to be at a premium. McClone Construction Company chose EFCO formwork to provide the **POWER TOWER PT-50®** system to hydraulically lift the formwork for the two identical 27'-8" (8.4 m) wide x 34' (10.4 m) long cores. Each shaft utilized four lifters to support the suspended **PLATE GIRDER®** wall form panels above the poured deck while the system also extended down into the core to provide lower platforms for installation of elevator components and interior slab access.

## EXTERIOR PROTECTION

McClone Construction Company also wanted an exterior protection system for the safety of their team working inside and

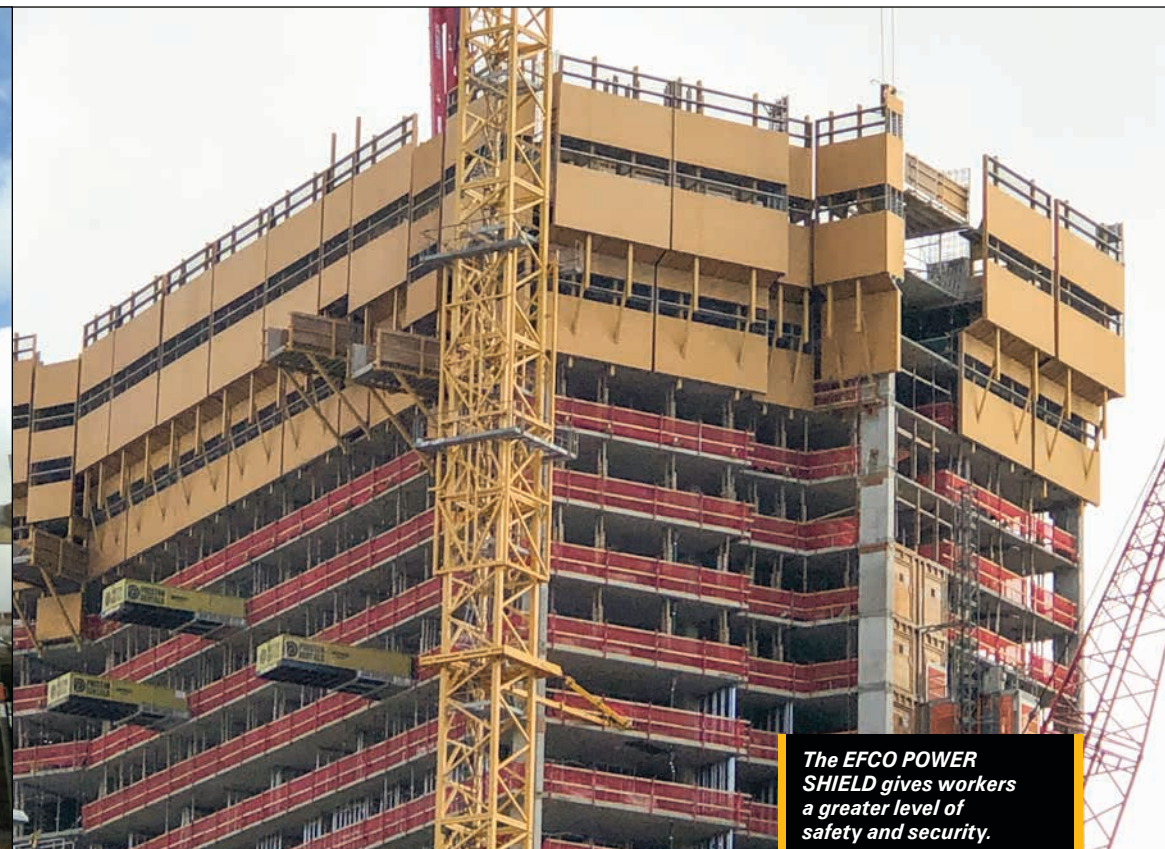
around the base of the structure. EFCO's **POWER SHIELD®** provided McClone not only that protection, but also three levels of perimeter platform access.

EFCO's systems helped provide McClone Construction Co. with the speed and safety they were looking for at A'ali'i. ◇

Chris Foster ..... Vice President  
Gabe Lewis ..... Project Manager  
Maegan Best ..... Project Manager  
Chris Moes ..... Engineering Manager  
Davis Browne ..... Superintendent  
Garrett Holm ..... EFCO Sr. Territory Manager  
Dennis Philpot ..... EFCO Field Supervisor  
Taylor Kvidera ..... EFCO Engineer



**POWER TOWER PT-50®** is one of two EFCO self-climbing systems that raise formwork vertically without relying on a crane for repetitious vertical lifts.



The EFCO **POWER SHIELD®** gives workers a greater level of safety and security.





# EASE IN ASSEMBLING & CYCLING

Providence, Rhode Island

## NEW PERFORMING ARTS VENUE

The Brown University Art Center will provide a new six-story performing arts venue. The 80,000 ft<sup>2</sup> (7,450 m<sup>2</sup>) art center will serve as the hub for the university's programs in music, theater and dance. Construction started in the fall 2019 and is expected to be completed in the summer of 2022.

## CONTRACTOR CHOSEN

John Strafach and Sons was selected to perform construction of the facility's concrete structures, including foundation walls in excess of 40' (12 m)H and two, large interior cores for the building's elevators and stairways.

## FOUNDATION WALLS

Most of the deep foundation walls are one-sided with a ledge on the exterior face of the wall. A tie-less one-sided form system was required to meet the project's criteria for schedule and waterproofing. Strafach chose EFCO's **Single-Sided Wall Truss (SSWT)** system in conjunction with **EFCO LITE**® panels for their ease of assembly and cycling, light weight, and their ability to provide a superior concrete finish.

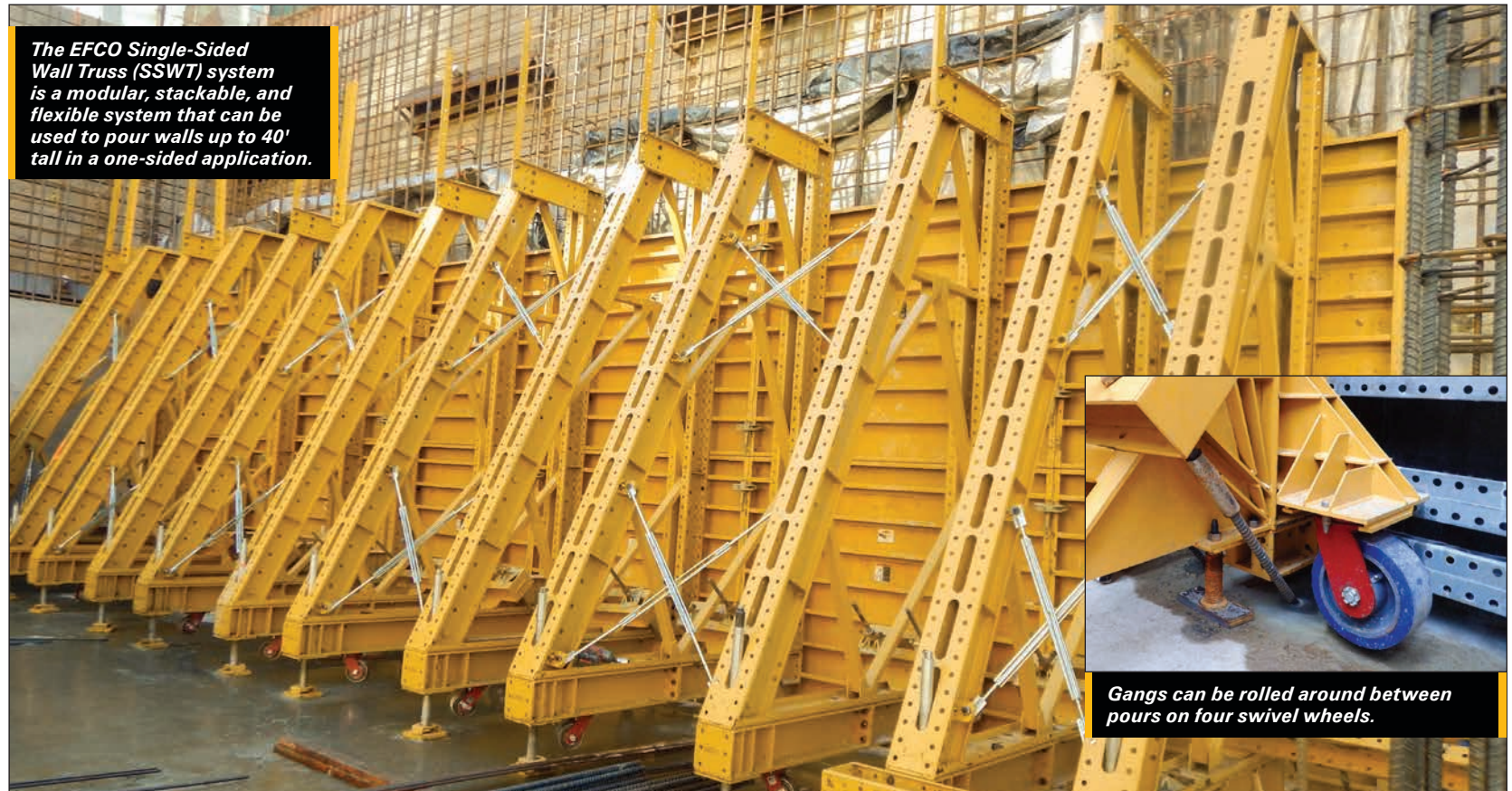
## ELEVATOR CORES

For the elevator and stair cores, EFCO LITE was also chosen. ◇

Tony Strafach . Concrete General Superintendent  
Dale Walker .... Concrete General Foreman  
John Strafach ..... Project Executive  
Jeff Augeri ..... Project Manager  
Bob Catani ..... EFCO Territory Manager  
Lou Szabo ..... EFCO Field Supervisor  
Joel Lindberg ..... EFCO Engineer



**SUPER STUDS®** are the backbone of the **EFCO LITE®** system, producing straight walls with multiple panels and can serve as a plumbing mast and alignment system.



*The **EFCO Single-Sided Wall Truss (SSWT)** system is a modular, stackable, and flexible system that can be used to pour walls up to 40' tall in a one-sided application.*

*Gangs can be rolled around between pours on four swivel wheels.*





# LIGHT & EFFICIENT SOLUTION

Atlanta, Georgia

## E-Z FLYER TABLES

Harcon Forming partnered with EFCO to form the above grade floors on the Village Park CORSO Retirement Community in the Buckhead community of Atlanta.

The Village Park CORSO Project had several factors that required careful planning. The size of the crane that could be installed resulted in limited lifting capacity and the build schedule was extremely tight. Originally, Harcon Forming considered using their own truss tables; however, at 15 lb/ft<sup>2</sup> (73 kg/m<sup>2</sup>) they were too heavy for the crane. EFCO proposed that Harcon Forming use the E-Z FLYER table 8-10 lb/ft<sup>2</sup> (39-49 kg/m<sup>2</sup>) which fell well within the crane limits.

## COMPONENTS

The E-Z FLYER table is made of standard EFCO components – EFCO E-Z DECK Posts and Screw Jacks, SUPER STUDS®, E-Z DECK® panels, pipe braces and E-BEAMS®. The largest tables used on this project were 45' (13.8 m)L x 14' (4.3 m)W with the crane capacity being the limiting factor. Build-up was done on top of some tables to accommodate beams and dropped balconies.

## EASE OF CYCLING

Cycling the tables was easily accomplished by using EFCO Crazy Wheel Dollies under the EFCO E-Z DECK Posts and EFCO Lifting Eyes under trap doors on the plywood deck. A two-man crew was able to wheel the tables off the deck with the assistance of the crane. A customer-owned compensator was used to level the tables as they were cycled.

The general superintendent was very pleased with the EFCO's E-Z FLYER table because of the quick build time and ease of cycling. ◇

John Burke ..... Project Manager  
Armando Garcia.. General Superintendent  
Teo Corral..... Superintendent  
Matt Seabury ..... EFCO Territory Manager  
Jim Ostrander..... EFCO Field Supervisor  
Eric Maciaszek..... EFCO Engineer



*Crazy Wheel Dollies attach to the bottom of the E-Z FLYER tables so they can be moved without tear-down and reassembly.*



*E-Z DECK® Posts are made of aluminum providing a reduction in weight while having a load rating up to 28 kip (124.5 kN) per leg capacity.*

“

*The build-up of the E-Z FLYER tables was faster than systems we already own. With all the weather and site delays, we were still able to top off on the original build schedule.*

*John Burke  
Project Manager*

”





# U.S. MARSHALS MUSEUM

Fort Smith, Arkansas

## DEVELOPED BY FIRST CONGRESS

Established over 200 years ago, the U.S. Marshal Service was developed by the first Congress in the Judiciary Act of 1789 and was led by George Washington. Recognizing a “gap” of government interests at a local level, the Marshal Service were assigned much of the law and order activities associated with territories and lawless frontier towns of the Old West.

In 1875, President Ulysses S. Grant nominated Isaac Parker to a seat on the United States District Court for the Western District of Arkansas located at Fort Smith. Nicknamed the “hanging” judge, 65 U.S. Deputy Marshals were killed in the line of duty enforcing Parker’s laws.

The U.S. Marshal Service continues to exist, but long gone are the days of Wyatt Earp and Wild Bill Hickok, two of the most notable United States Deputy Marshals in our history. Over the years, more than 400 U.S. Marshals have lost their lives in the line of duty.

“

*After testing the results of placing concrete with three different competitive formwork systems, the architect said the finish from EFCO’s system provided exactly what they wanted on the U.S. Marshals Museum.*

**Tremayne Harris**  
Harris Trucking & Concrete

”

## CONSIDERED SACRED GROUND

In January 2007, former U.S. Marshals Service Director, John Clark, announced the decision that Fort Smith, Arkansas would be the home of the United States Marshals Museum. Fort Smith is often considered sacred ground for the Marshals. During our nation’s frontier era, more marshals and deputy marshals died riding out of Fort Smith during the frontier era than in any other place or time in our nation’s history. This exciting site announcement culminated a highly competitive selection process that had spanned several years. The dedicated group of volunteers who had represented Fort Smith throughout this selection process had worked incredibly hard to earn this honor for their community. With the site designation in hand, the work then expanded and escalated.

While the U.S. Marshals Museum is specifically dedicated to honoring a federal law enforcement agency, the museum is not federally funded. Instead, this project is being funded almost entirely by the generosity of foundation, business, and individual donors.

## CHOSEN FOR QUALITY CONCRETE FINISH

For construction of the U.S. Marshals Museum Project located at Fort Smith, Arkansas, **Harris Trucking & Concrete Construction** needed a formwork solution that could produce the best architectural concrete finish, using minimal ties. A test pour using three separate supplier’s systems was completed with EFCO **PLATE GIRDER®** being selected by the owner and architect. The project’s focal point consisted of wall heights starting at

*The PLATE GIRDER® panel is a complete form unit which does not require external walers or stiffbacks. Walers and stiffbacks are all built into the form panel.*



6' (1.8 m) and angling to 26' (8 m) tall, in a single 92' (28 m) long pour. This project also included 11 other pours ranging from 78' to 125' (24 m to 38 m) in length. The EFCO Team had to determine the best size of **PLATE GIRDERS** to offer the least number of ties as per the architect’s specifications. ◇

Ted Garrison ..... CDI Project Manager  
Chris Boyle ..... Project Superintendent  
Tremayne Harris... Concrete Superintendent  
Douglas Whipple ...EFCO Territory Manager  
Mark McCarty ..... EFCO Field Supervisor  
Ross Horton..... EFCO Engineer





# EFCO's STRONGEST

San Francisco, California

## THE LEVEL 8 BRIDGE

When Webcor consulted with EFCO during the preliminary phases of construction on the Trinity Phase IV, a 17-story mixed-use structure in San Francisco, California, Webcor knew EFCO had what it takes to form one of the key structural and aesthetic elements offered by this project: The Level 8 Bridge.

## BRIDGE TO CONNECT RESIDENTIAL TOWERS

Situated nearly 80' (25 m) above Market Street, the 11" (3.4 m) thick Level 8 Bridge deck spans the 48' (14.6 m) gap between the two residential towers to reconnect them from Level 8 through the roof. In order to give the 70' (21.3 m) wide Level 8 deck slab a clean, flat soffit, the Level 10 deck above was structurally designed with cast-in-place drop beams up to 6'-6" (2 m) deep and cast in with structural steel drop hangers to help suspend the Level 8 deck from above. With these types of heavy construction loads, EFCO had to roll out the best and strongest formwork in our arsenal: The new EFCO **SUPER PLATE GIRDER®**!

## SUPER PLATE GIRDER = EFCO'S STRONGEST FORMWORK

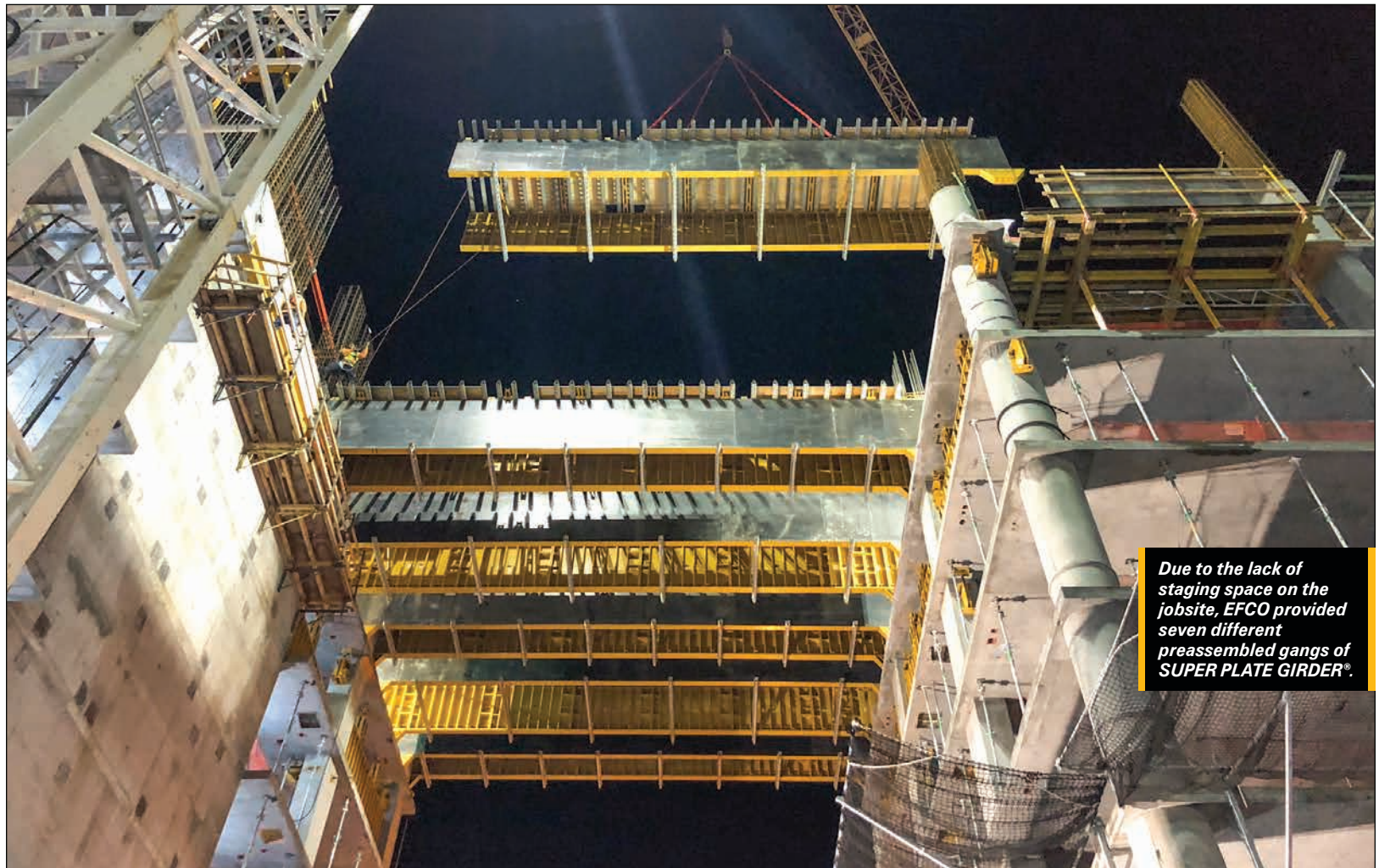
EFCO design engineers chose the seven **SUPER PLATE GIRDER** decks, measuring up to 12' (3,600 m) wide, to provide 3,200 ft<sup>2</sup> (300 m<sup>2</sup>) of decking to support the high loads from the beams and decks with a great level of safety and minimal deflection. The pour sequence consisted of pouring L10 first with the support of the L8 **SUPER PLATE GIRDER** tables prior to pouring the L8 slab. EFCO strategically located shore post supports over the **SUPER PLATE GIRDER** beams so the **E-Z DECK®** shore towers could transfer the L10 load

properly. EFCO also assisted Webcor with pre-cambering information.

Due to the lack of staging space on the jobsite, Webcor requested that EFCO provide a preassembly service to build the

6' (1,800 mm)D **SUPER PLATE GIRDER** tables, some measuring 54' (16.5 m)L x 12' (3.6 m)W, and ship as full units to San Francisco. With careful delivery coordination and mother nature providing a pocket of good weather and low winds, all seven gangs on seven separate trucks were delivered on a time-sensitive and truck-specific schedule so Webcor could set them in place within a 3-1/2 hour window. ◇

Michael Gilmore ..... Construction Manager  
Ivan Ramos ..... Sr. Superintendent  
Kohlton Kauffman ..... Superintendent  
Mitch Yoffe ..... Project Manager  
Brian Barsotti ..... EFCO Territory Manager  
Matt Bruce ..... EFCO Field Supervisor  
John King ..... EFCO Engineer



Due to the lack of staging space on the jobsite, EFCO provided seven different preassembled gangs of **SUPER PLATE GIRDER®**.





# EFCO CHOSEN FOR SAFETY & EFFICIENCY

Los Angeles, California

## A UNIQUE HOTEL WITH UNIQUE CHALLENGES

The Dutch-based hotel chain, citizenM, broke ground on a new luxury hotel in Los Angeles in the second half of 2019. The hotel's modular design created unique challenges to forming the core, including heavy seismic reinforcement and substantial embed plates for the modules to mount to. The modular units were pre-built overseas and could not be received until the core was completed. With so much relying on this critical path, an experienced concrete contractor was essential. **Pacific Structures** was the obvious choice to tackle the unique challenges of the project.

Pacific Structures partnered with EFCO to design a forming solution to construct the core with speed and simplicity being important goals. Several EFCO systems were engineered to increase efficiency and safety while providing the lowest in-place concrete costs for the project.

EFCO systems used:

- **PLATE GIRDER®** Wall Gangs
- **GUIDED RAIL SYSTEM®**
- Flipper Lock Platforms
- Manual Retractable Corners
- **EFCO LITE®** Column Forms

## REBAR AS CONGESTED AS THE LOS ANGELES TRAFFIC

EFCO **PLATE GIRDER** panels with retractable stripping corners were selected for the elevator core. The strength of the **PLATE GIRDER** panels enabled the interior core forms, Flipper Lock Platform and trailing decks to be picked as a single

unit. This reduced valuable crane time needed for the heavy rebar cages and permitted the walls to be reset quickly. To further mitigate the challenges of the rebar congestion, EFCO **PLATE GIRDER** panels were used to minimize the quantity of ties. Only 20 ties were needed for all 2,150 ft<sup>2</sup> (200 m<sup>2</sup>) of core formwork.

## EFCO ENGINEERS SPEED AND SAFETY

Exterior Forms were cycled with EFCO's **GUIDED RAIL** system remaining on the core for the complete 130' (40 m) ride to the top. This solution freed up valuable ground space and enabled Pacific Structures to cycle formwork quickly, even during high wind situations. The **GUIDED RAIL SYSTEM**'S large work platforms were engineered to exceed CALOSHA standards and create a safe and efficient workspace overlooking the heart of the Los Angeles Historic District.

## CORE COMPLETION

The hotel's 132' (40.2 m) core was completed in 12 pours of varying heights. With EFCO formwork and Pacific Structure's experience, the core crew was able to cycle and pour twice a week by the completion of the project. ♦

Sergio Robles.....General Foreman  
Ryan O' Sullivan.....Project Engineer  
Mark McCloskey.....Project Manager  
Paul Tracey .....General Superintendent  
Joshua Blomeyer ...EFCO Territory Manager  
Kris Aguilar ..... EFCO Field Supervisor  
Kyle Hamilton ..... EFCO Engineer

*Rails attached to the wall keep the total form system package, work platforms and support system attached to the wall during the form lifting process.*

“

*What I liked about EFCO was the sparsity of the ties, especially when dealing with heavy seismic rebar. Another big plus were the shoes on the **GUIDED RAIL SYSTEM®** which kept the system tied to the walls. Most competitors' platforms come away from the walls when cycling and it's very dangerous in high wind situations.*

**Paul Tracey**  
General Superintendent

”







# UNIQUE V-COLUMNS

Aurora, Colorado

## ANSCHUTZ HEALTH SCIENCES BUILDING

The University of Colorado Anschutz campus is one of the largest and most advanced academic medical campuses in the nation and was due for an expansion. This project is to support multiple users, including researchers, faculty and staff, students and patients. It includes facilities for computational research and clinical trials, an educational medical simulation hub, mental/behavioral health research clinics, faculty offices, and other educational and amenity spaces to be shared by the campus.

## PROJECT SCOPE

JE Dunn utilized multiple systems provided by EFCO for vertical concrete. To start, JE Dunn used EFCO **PLATE GIRDER**® forms

to cast the foundation and numerous sizes of complex pilasters around the perimeter of the job. There are also a total of four cores on this project, each using **PLATE GIRDER** forms going slab to slab. For this case, the core systems will cycle floor to floor with the crane as the slabs go up around them. Each core was equipped with a **Flipper Lock Platform** built with **E-BEAMS**® and **SUPER STUDS**® for access. Flipper Lock Platforms cycle upward into pockets cast into the next pour. Throughout the job, various column sizes were formed using **EFCO LITE**® as well as **PLATE GIRDER** formwork. Using drawings provided by JE Dunn, EFCO designed and built custom 40' (12.2 m) V-column forms that are being used for the front of the structure.



When finished, this job will be a 390,914 ft<sup>2</sup> (36,320 m<sup>2</sup>), LEED Gold, 7-story building for the University of Colorado. The Anschutz Health Sciences Building will be an integral and dynamic focal point of the campus, furthering its trajectory as one of the leading medical care, research and education facilities in the world. ◇

Eric Snelling..... General Superintendent  
Michael Grams..... Superintendent  
Teddy Benzor..... General Foreman  
Aaron Rickli..... EFCO Territory Manager  
Skyler Saemisch ..... EFCO Field Supervisor  
Jill Provost ..... EFCO Engineer



*EFCO designed and built custom 40' (12.2 m) V-column forms that are being used for the front of the structure.*





# MALVA TOWER

San Pedro Garza García City, Nuevo Leon, Mexico

## 20-STORY BUILDING

Malva Tower is the first of five office towers to be built in the Armida District Complex in San Pedro Garza García City, Nuevo Leon, Mexico. The tower is a mixed-use, 20-story building with more than 195,000 ft<sup>2</sup> (18,000 m<sup>2</sup>) of offices for lease or sale. The surface area equals 9,935 ft<sup>2</sup> (923 m<sup>2</sup>) per story and averages 13'-10" (4.2 m) story heights. Malva Tower has an elegant, yet comfortable design to encourage business, connections and productivity. By its construction end, it is intended to achieve LEED certification.

## PERIMETER PROTECTION

The EFCO POWER SHIELD® system was used as perimeter protection for this project, covering three and a half stories. The main goal of its use was to improve on labor efficiency and be used by the Armida District Complex Sales Team as direct on-site advertising to boost promotion of the offices for lease/sale. The contractor, **GM Capital**, also saw the opportunity and immediately invested in large advertisements that were attached to EFCO POWER SHIELD gangs.

With the EFCO POWER SHIELD system, GM Capital managed to achieve the following objectives:

## SAFETY

Protection against material and personnel falling, plus minimizing unsafe weather conditions. Trust and safety raised in workforce personnel.

## PUBLICITY

Boosting pre-sales of the Malva Tower office space; EFCO POWER SHIELD screen gangs were the perfect place for advertising.

## EFFICIENCY

A measurable increase in workforce productivity, keeping personnel safe and confident in their work environment. At the same time, EFCO POWER SHIELD lowers crane dependence, as it is a self-sufficient, hydraulic powered system.

Besides offering surrounding story protection, EFCO POWER SHIELD continues to deliver both security and efficiency on the jobsite. Plus, there is an added value of advertising, which makes this system a profitable investment for any real estate developer or construction company. ♦

Juan Carlos Campos.....Project Manager  
Pedro Torres.....Site Manager  
Alberto Agüero .....EFCO Territory Manager  
Rosalio Ramos ..... EFCO Field Supervisor  
Francisco Ortega ..... EFCO Engineer



*A look at the EFCO POWER SHIELD® from inside the building. It gives any worker a greater level of safety and security.*



*The added value to the EFCO POWER SHIELD is a place for advertising, which makes this system a profitable investment*





# LURIN SAGA WAREHOUSES

Lurin, Lima, Peru

## COMMITTED TO QUALITY AND SAFETY

Fase Dos Ingenieria y Construccion, a Peruvian company founded in 2000, offers the Peruvian market comprehensive engineering solutions for the design, execution and construction of real estate for corporate, commercial, industrial, educational, and mining projects. Over the years, it has succeeded in maintaining a growing prominence, thanks to the commitment shown in the projects they have developed. Thus, today Fase Dos is positioned as a solid and professional company committed to the quality and safety objectives in each project. Fase Dos has been EFCO's client since 2006 and together they have completed other projects such as "Multifamiliar Jesus María" (Jesus Maria Multifamily), "Edificio Barrenechea," "Edificio Prana" and Saga Falabella Department Stores.

## DETAILS OF THE PROJECT AND SYSTEM USED

Fase Dos was selected as the contractor for the Ciudad Industrial Macropolis Project located in the district of Lurin. Fase Dos chose to use the **EFCO LITE**® system because, when compared to other formwork systems, it provided an opportunity to cast very tall columns in less time due to its high pour pressure rating. Plus, gangs of EFCO LITE formwork could be lifted at one time, reducing the amount of crane picks. Another outstanding advantage of EFCO formwork is the optimum architectural finish that all-steel face sheets create, reducing the amount of finishing work. EFCO LITE formwork was used to form columns measuring 2'-6" (750 mm) x 2'-6" (750 mm) with variable heights from 28'-7"

(8.70 m) to 32'-10" (10.00 m). Six sets of EFCO LITE forms were used to complete six columns a day.

The client was satisfied with the all-around service delivered, including: EFCO engineered solutions, field support and service, sales and delivery. ◇

Elvis Rojas .....Resident Engineer  
Cesar Caso .....Production Leader  
Henry Solis ..... Technical Office Leader  
Eduardo Alva .....EFCO Territory Manager  
Christian Arteaga .... EFCO Field Supervisor  
Daniel Fernandez ..... EFCO Engineer



*Six sets of EFCO LITE® forms were used to complete six columns a day.*







# E-COMMERCE CENTER PROJECT

Muntinlupa City, Philippines

## ABOUT THE COMPANY

R & M Perez Design and Construction is a "AAA" construction company in the Philippines. It is owned by Rodrigo and Marissa Perez, who are serving as the general contractor of the E-commerce Center Project. The E-commerce Center Project, located in Daang Hari and Daang Reyna Junction in Muntinlupa City, is owned by AC Infrastructure Holdings Corporation and is in partnership with Zalora, Asia Pacific's leading group of online fashion retailers. This fulfillment center will have 430,500 ft<sup>2</sup> (40,000 m<sup>2</sup>) of racking space and a 7.2M item storage capacity upon completion.

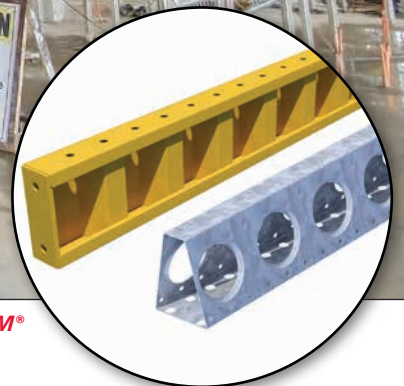
## PRO 4 SHORING AND HAND-E-FORM FORMWORK

Because a quality concrete finish was desired for this project, R & M Perez chose EFCO as their formwork and shoring partner. EFCO provided **PRO 4**® shoring for the beam and slab structure and **HAND-E-FORM**® for the columns and shear wall. Because the **HAND-E-FORM** system is lightweight and easy to use, R & M Perez Design and Construction completed the project earlier than the expected deadline. Plus, they achieved a remarkable concrete finish since the **HAND-E-FORM** system does not use any phenolic board or plywood. ♦

Rodrigo Perez..... President  
Jestan Magat II.....Project Manager  
Jayson Garma .....Formworks Engineer  
Jhoggy Klein Dela Torre..EFCO Territory Manager  
Abunasif Gubat ..... EFCO Field Supervisor  
Jeanna Fernandez ..... EFCO Engineer



*The combined strength of the PRO 4® Post and the Z-BEAM® stringer and E-BEAM® joist means using fewer posts.*



Z-BEAM AND E-BEAM

www.EFCOFORMS.com | 53





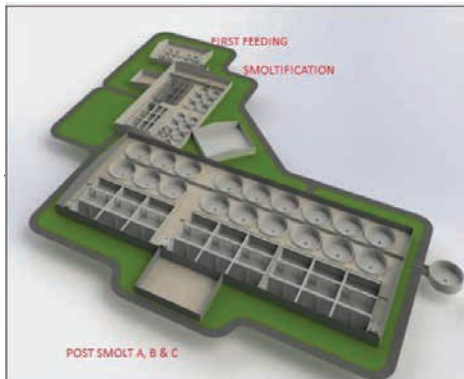
# QUALITY CONCRETE FINISH

**Marystown, Newfoundland and Labrador, Canada**

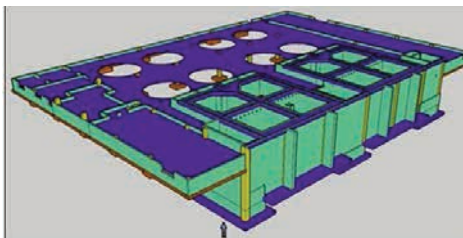
## **SALMON FARM**

Grieg NL Development, Ltd., the project arm of Grieg NL Salmon, Ltd., is currently overseeing the concrete construction portion of their land-based Atlantic Salmon Farm located in Marystown, Newfoundland and Labrador, Canada.

The Marystown Hatchery will consist of three buildings—First Feeding, Smoltification, and Post Smoltification—as represented below, covering 250,000 ft<sup>2</sup> (23,225 m<sup>2</sup>) at the Marystown Marine Industrial Park. Upon completion, this facility will be the world's largest indoor salmon aquaculture facility.



To put the physical scale of this project into perspective, below is an image of a man standing beside the First Feeding building, the smallest of the three buildings:



Grieg NL partnered with EFCO as their "single formwork supplier," with both parties sharing a common vision of "Quality," "Innovation," "Integrity," and "Super Service."

## **STRIVING FOR BEST QUALITY**

The EFCO Team, as part of their commitment to the success of the project, worked hand-in-hand with Grieg on many high-priority topics such as cross-contamination

between tanks, non-toxic form release agents, and quality of finishes, which all affect the life and well-being of the salmon.

## **FIRST FEEDING BUILDING**

EFCO engineering centered its formwork design for this project around EFCO's **PLATE GIRDER**® forming system, with its precision-built all-steel face sheets delivering consistent superior concrete finishes and with fewer form joints and tight seams, minimizing finishing costs. Additionally, EFCO incorporated its **SUPER STUD**® and **E-BEAM**® forming system and **E-Z DECK**® shoring into the project to work in conjunction with the **PLATE GIRDER** forms, providing flexibility in the forming process due to the complexity of the overall project design.

EFCO Field Supervisor, Richard Wilder, has been working with Grieg, both on site and remotely, to ensure all questions and concerns are dealt with immediately as not to delay any progress related to formwork on the project.

Construction of the First Feeding building is nearing completion, and concrete forming is well underway on the Smoltification building. EFCO engineers are working on erection drawings for the Post Smoltification A building, scheduled to start in early spring. ◇

Grant Horwood, P.Eng. .... Project Manager  
Craig Moore, P.Tech. .. Owner's Representative  
David Page ..... EFCO Territory Manager  
Richard Wilder ..... EFCO Field Supervisor  
Niels Wilcken, P.E. .... EFCO Engineer



**EFCO's PLATE GIRDER®** system uses less ties and delivers consistent superior concrete finishes, minimizing finishing costs.





# CAST-IN-PLACE CULVERT TO DIVERT WATER

Council Bluffs, Iowa

## PLACEMENT NEEDED BEFORE HIGHWAY CONSTRUCTION

Hawkins Construction was awarded the East Beltway Project. This project is an effort to improve transportation for the continued land development of eastern Council Bluffs, Iowa. The scope of it is to link US Highway 6 to US Highway 92. Prior to the new road going in, Hawkins Construction needed to construct two sections of box culvert to divert water for the new road system.

## EFCO'S BOX CULVERT TRAVELER

The first of two box culverts had double boxes, with each box measuring 12' (3,600 m)W x 12' (3,600 m)H and 342' (105 m)L. Hawkins utilized a 40' (12 m) long EFCO Box Culvert Traveler to complete this stretch of culvert in 10 pours. The Traveler was constructed with EFCO's standard EFCO LITE® wall system along with the needed box culvert system accessories.

## PROCESS TO CYCLING AND COMPLETING A POUR PER DAY

After building up the inside and outside wall forms and roof panels, the inside wall forms were flown into place. After setting the inside forms, the interior bracing, including the collapsible headers, were attached. Once this was completed, the roof panels were flown into position and fastened. At that point, the interior of the box was complete and ready for the reinforcing steel to be tied, then the outside forms were set in place and the bulkheads were assembled.

After completion of the first pour, EFCO SUPER STUDS® were laid across the roof to support the roof ties that were cast in the pour. Once the roof ties were properly tightened to carry the load of the roof, the outside forms were secured, the interior box traveler was retracted, and the traveler was cycled forward to the next position. Sean Santana, Hawkins' superintendent, was instrumental in learning the system and leading his crew on an efficient cycling method for the Box Culvert Traveler so they could easily complete a pour every other day.

The second box culvert was very similar to the first, measuring 12' (3,600 m)W x 10' (3,000 mm)H. Once the first culvert section was completed, Hawkins disassembled the roof forms and removed a 2' (600 mm) panel from the wall form. Once put back together, the second box ran 792' (240 m) long and required 20 pours with the 40' (12 m) long traveler system. Hawkins will finish these cast-in-place box culverts in early 2020, so the new road can be completed in the spring. ◇

Ryan Scranton ..... Project Manager  
Josh Eisenmann ..... Project Superintendent  
Sean Santana ..... Project Superintendent  
Mike Bowden ... EFCO Territory Manager  
Matt Harrington ..... EFCO Field Supervisor  
Jake Thies ..... EFCO Engineer



A 40' (12 m) long EFCO Box Culvert Traveler was used to complete the stretch of culvert in 10 pours.



The Traveler was constructed with EFCO's standard EFCO LITE® wall system along with the needed box culvert system accessories.





# FUEL REFINERY PLANT CONSTRUCTION

Buenos Aires, Argentina

## EXPANSION DETAIL

The Axion Energy refinery plant, located in the city of Campana, is the largest fuel refining project to be constructed in the last 30 years in Argentina. With an investment of US\$1.5B, the refinery will increase fuel production by 60%, in addition to improving the quality of the gasoline and diesel produced there. The expansion of the plant has generated work for more than 3,000 people and, upon completion, more than 125 mile (200 km) of pipes, 45,800 yd<sup>3</sup> (35,000 m<sup>3</sup>) of concrete, 15,435 tons (14,000 tonnes) of metal structure and more than 183,000 yd<sup>3</sup> (140,000 m<sup>3</sup>) of soil will have been installed.

## TANKS & COKE MAZE SECTOR

Ingenieria Rinaldi y Asociados SA was in charge of overseeing the following structures: The Biox effluent treatment tank, consisting of 4,580 yd<sup>3</sup> (3,500 m<sup>3</sup>) of concrete, with dimensions of 158' (48 m) x 115' (35 m) and a height of 26'-3" (8 m); two water clarifier tanks measuring 69'-3" (21.10 m) in diameter and 16'-5" (5 m) in height; and the mud chamber and interior partitions in the Coke Maze sector.

## EFCO SYSTEMS USED

EFCO used a combination of EFCO systems to meet the client's needs on each structure. The **PLATE GIRDER**® system was used to form the Biox tank. With 18,100 ft<sup>2</sup> (1680 m<sup>2</sup>) of floor area, the exterior partitions of the tank have a variable wall thickness of 1'-4" (400 mm) to 2'-2" (650 mm) and varying heights from 11' (3.35 m) to 26'-3" (8 m). The interior wall partitions are 1'-4" (400 mm) thick and 26'-3" (8 m) high. One of the elements taken into consideration when

determining a formwork solution was the capacity of the crane, whose maximum capacity was 441 lb (2,000 kg) and capable of lifting gangs of **PLATE GIRDER** formwork. The **PLATE GIRDER** formwork was bolted together into gangs and quickly cycled into position. In addition, the **E-Z DECK**® system was used to shore the perimeter work platforms.

The **HAND-E-FORM**® system, EFCO's handset formwork, was the best option for casting the clarifier tanks, mud chamber and partitions of the Coke Maze, because there was no access to a crane. ◇

Brenda Martín .....Project Coordinator  
Martín Flores .....Superintendent  
Isabel Mendez Pereira .....Superintendent  
Gabriela Loveri .....EFCO Territory Manager  
Roberto Janco Ympa. EFCO Field Supervisor  
Gastón Campagnolle .....EFCO Engineer



Standard **HAND-E-FORM**® panels when used with **HAND-E-FORM** flexible panels will form tanks and curved walls.



A combination of different EFCO systems were used to meet the client's needs on each structure.



# SAFETY AT SEA

## UNITED KINGDOM

### NEW FLEET OF NUCLEAR STATIONS

In order to provide energy security and prevent power shortages, the United Kingdom is working towards complete decarbonization of the power generation sector by 2050. The government has commissioned a new fleet of nuclear stations and, at the same time, is investing heavily in renewables like wind, solar, wave and tidal energy generations. The first of these projects to move into the construction phase is Hinkley C, the third reactor set at the site in Somerset in the southwest of the United Kingdom.

The project involves the construction of two EPR reactors with a combined power output of 3,200 MW. Construction work on the project began in 2018 with a scheduled completion date of 2023 at a target price of over US\$25B (£20B).

### RESPONSIBLE FOR MARINE PACKAGE

EFCO UK, working with **Kilnbridge Construction** and primary contractor Balfour Beatty, has been providing formwork solutions within the Marine



At EFCO®, our team members are our most valuable assets. We share this ideology with our customers in that they, too, recognize the value of their team members and the direct impact they have on the business.

EFCO demonstrates our commitment to safety with an Awards Program. Each winner receives a personalized plaque (pictured left) and appears in FORM MARKS® magazine.

- Al Jennings • Chairman of the Board

package of the project. At Avonmouth, docks the construction of the inlet and outfall heads has been progressing since early 2019. These precast structures will eventually be rolled onto barges and taken to a location off the coast of the main site



*Per request, EFCO designed a solution that eliminated the need for through ties in the structure.*

and lifted onto the seabed to regulate the flow of cooling sea water to the reactors. In total, there are four inlet heads and two outfall heads that will connect to the end of the 23' (7 m) diameter tunnels currently being constructed under the sea. With each head weighing up to 6,065 tons (5,500 tonnes) and a projected 80-year lifespan on the seabed, the process for construction and tolerances are at a level rarely seen in the construction industry.

### DESIGNED TO AVOID THROUGH TIES

In total, EFCO UK has provided over 23,680 ft<sup>2</sup> (2,200 m<sup>2</sup>) [330 ton (300 tonnes)] of **PLATE GIRDER®**, **REDI-RADIUS®** and **SUPER STUD®** forms for the project as

*Continued on page 62...*



...Continued from page 61

well as custom transition cones for the central shafts. One significant challenging specification was for all formwork to contain the loads implied from the cast concrete without internal ties that would prove to be weak spots in the structure given the final environment and duration the structures will be in operation. EFCO provided a solution that combined ring compression and internal bracing to restrain the shaft and void formers and externally anchors, SUPER STUD® A frames and bracing. This approach eliminated the need for through ties in the structure. ◇



David Sanchez ..... Project Manager  
Michael Tiffoney ... Construction Manager  
Kestutis Sileikis .... Construction Manager  
Juan Reyes ... Temporary Works Engineer  
Gary Dillon ..... EFCO Territory Manager  
Colin Walker ..... EFCO Field Supervisor  
Judd Davidson ..... EFCO Engineer



“

*The entire project team sees that health and safety culture and performance is a key contributor towards achieving engineering excellence and the world class quality standards required on these class 1 nuclear structures. The active involvement and buy-in of our supply chain members is an essential enabler to realizing this goal. The EFCO Management Team and field engineering support on this project has ensured that this high bar is a realistic target which can be met in a safe and efficient manner.*

**Rick Kopec**  
Contracts Manager

”





# MINIMAL FINISHING WORK NEEDED

Vancouver, British Columbia, Canada

## FIRST NARROWS PUMP STATION

Tom Wood Contracting, Ltd. chose EFCO to supply the radial formwork required to form the North Shore Waste Water Treatment Plant Project—First Narrows Pump Station in Vancouver, British Columbia. Tom Wood Contracting, known for their suspended slab and vertical forming innovations and quality workmanship, knew the EFCO REDI-RADIUS® wall forming system was the right solution for their project.

## REDI-RADIUS USED FOR RADIAL TANK

The 60'-8" (18.5 m) diameter tank was poured full diameter in three 13' (3962 mm) lifts for a total wall height of 39' (11.9 m). Radial forming with minimal form joints means a smooth finish and low finishing costs. EFCO SUPER STUDS® provided the necessary bracing required to support the tieless, one-sided solution. SUPER STUDS not only provided the one-sided load transfer, but also provided work deck access for the subsequent form jumps. Large pipe protrusions, as well as interior connecting walls, added to the complexity of the design. The formwork gangs were preassembled and then lowered into the pump station as fully assembled, one-sided, ready-to-go gangs. ♦

Desmond Vernon ..... Project Manager  
Ben Sims ..... Superintendent  
Marcel Gagnon ..... Superintendent  
Max Quesnel ..... Foreman  
Jorge Vanegas ..... EFCO Territory Manager  
Rob Cottam ..... EFCO Field Supervisor  
Christopher Manson ..... EFCO Engineer

“

*When forming complex concrete and working innovative forming solutions, EFCO is definitely one of our go-to forming partners.*

**Desmond Vernon**  
Project Manager

”



**EFCO REDI-RADIUS® formwork was bolted to SUPER STUD® bracing and staged ahead of being placed with the crane.**



### INTEGRATED STRAP

**EFCO REDI-RADIUS® Sr. panels have an integrated strap that adjusts to any radius greater than 18'-0" (5.5 m) with no loose pieces. If a tighter radius is required, EFCO offers the REDI-RADIUS Jr. with a minimum radius dimension of 9' (2.75 m).**







# NEEDING MINIMAL TIES Was KEY TO SUCCESS

Scranton, Pennsylvania

## BENEFITS OF A COMBINED SEWER OVERFLOW (CSO)

The CSO #30 Project is being completed in accordance with PAWC's Scranton Wastewater Combined Sewer Overflow (CSO) Long-term Control Plan. This is a 25-year program for the purpose of significantly reducing combined sewage overflow and to attain water quality standards within the receiving streams in and around the city of Scranton. The 25-year program includes approximately 60 control projects. The CSO #30 will reduce the annual average number of combined sewer overflow events at the CSO #30 regulator from 45 to 2 and reduce the volume of combined sewer discharged by nearly 85%. During wet weather events, the new 1.34 MG CSO #30 storage tank will capture the combined sewage overflow that would normally be discharged from the CSO #30 regulator chamber into the Roaring Brook and hold it until the rain event is over and the system is no longer overloaded. At that point it will release the combined sewage back into the collection system for conveyance to the Scranton Wastewater Treatment Plant.

CSOs, also known as regulators, are used in sewer systems that not only take in sewage, but also take in the storm water from the basins in the street. These types of systems are known as combined systems. In a heavy rain event, a combined system can become surcharged. To reduce the excess flow and to prevent possible damage to homes and sewer systems, regulators are designed to open at a predetermined level of flow and discharge

the excess flow to a river or stream. Once the flow has reduced, the regulator closes and all flow is directed back into the sanitary system.

## CONSTRUCTION OF CSO #30

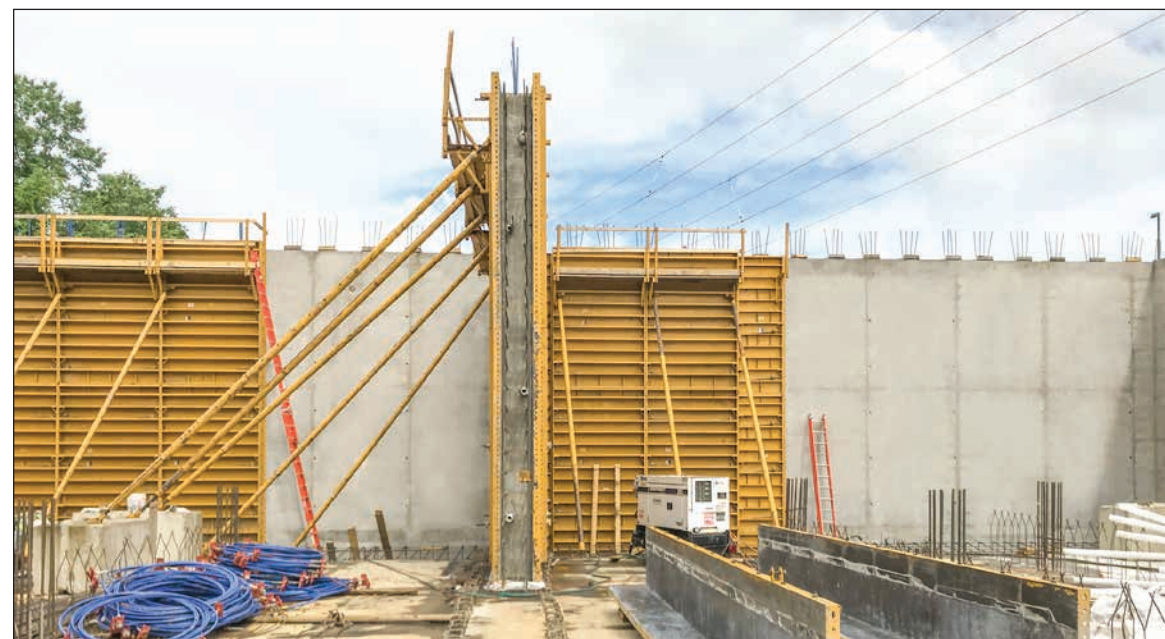
Leeward Construction was awarded the contract for the Prescott Avenue CSO #30. Construction began in March of 2019 and is scheduled to be completed in Spring of 2020.

Leeward Construction knew they needed a forming system that was easily ganged and cycled in large sections for this project. During the design phase, it was decided the EFCO **PLATE GIRDER**® system was the perfect formwork for the 24' (7.3 m) to 29' (8.8 m) tall walls and columns. Using large panels with minimal ties was key to their success. Leeward also decided to partner with EFCO for shoring to support the 15,500 ft<sup>2</sup> (1,440 m<sup>2</sup>) of 10" (300 mm) thick concrete slab that covers the CSO using 23' (7 m) tall **E-Z DECK**® towers with leg spacing at 8' (2,440 mm) x 6' (1,830 mm) and 8' (2,440 mm) x 4' (1,220 mm). Once completed, the slab that covers the CSO will be utilized as tennis courts for community use. ♦

Matt Green ..... Project Manager  
Mike Bonham ..... General Superintendent  
Mark Dulacy ..... EFCO Territory Manager  
Rick Lynch ..... EFCO Field Supervisor  
John Lust ..... EFCO Engineer



*The EFCO **PLATE GIRDER**® system was the perfect formwork for the 24' (7.3 m) to 29' (8.8 m) tall walls and columns.*







# DEVIATION TUNNEL

Valle de Lluta, Arica, Chile

## SCHEDULING AROUND RIVER FLOW

The Chironta reservoir is a hydraulic project for the storage of irrigation water to support agricultural activity in the region. It is located in the Lluta River basin, region of Arica and Parinacota. **Consorcio Embalse Chironta S.A.**—comprised of Besalco S.A. and Dragados S.A.—started construction of this project May 2017, and it is scheduled to start operating in November 2021. The estimated total cost is US\$140M.

The Lluta River increases its flow considerably each summer, and this is a crucial factor for the annual scheduling of construction work. Due to this, the EFCO

Team worked very hard to coordinate both the engineering process and the shipment of the needed equipment to comply with the demanding schedule.

## PROJECT HIGHLIGHTS

The first and most important part of the project included the construction of the deviation tunnel, which required a demanding solution for the workload. Both the vertical elements and shoring in the construction of the vaults, that in some cases supported more than two meters of concrete due to the varying rock, were challenging problems to solve. These challenges were



*The one-sided and two-sided tunnel walls were formed with high-strength EFCO PLATE GIRDER® formwork using SUPER STUD® braces.*



*E-Z DECK® towers supported work platforms and were positioned to provide enough space for work vehicle traffic to continue through the tunnel.*

met with the versatility of the **SUPER STUD®** system, the safety assurance of the **E-Z DECK®** shoring and the high strength resistance of the **PLATE GIRDER®**, both in one-sided and two-sided walls.

The second stage of the project consists of completing the interior walls of the cavern, which separate the water within the tunnel. It also requires completing the entrance portal by December 2020 while working around the flow increase season. ◇

Francisco Javier López.....Project Manager  
Sebastián Burgos..... Civil Job Chief  
Marcos Parra ..... Civil Job Supervisor  
Pablo Rodríguez ....EFCO Territory Manager  
Mauricio Rivera....EFCO Sr. Field Supervisor  
Manuel Henríquez ..... EFCO Engineer





# AIRPORT TERMINAL REDEVELOPMENT

Newark, New Jersey

## APPROACH STRUCTURES

The Port Authority of New York & New Jersey has invested US\$2.7B at Newark Liberty International Airport to replace Terminal A. The approach structures have been broken into different contracts, one of which, **Conti Enterprises, Inc.** of Edison, New Jersey, was awarded. Conti is no stranger to the Newark Airport as they have done work ranging from roadway and runway work to bridges and pump stations to fuel pipeline modifications. These projects are included in the more than 20 projects Conti has completed with the PANYNJ over the past 15 years.

## IMPROVED PRODUCTIVITY

Terminal One Redevelopment includes a new terminal, new roadway access network and parking structures as well as Airtrain access, which connects to New Jersey Transit. Conti's US\$150M portion of the Terminal One Redevelopment includes three bridge structures: N61 is approximately 895' (275 m) long, N62 is approximately 660' (200 m) long, and N63 approximately 850' (260 m) long. The curved structures include 13 pier caps along with abutments and wing walls. When working on the pier caps, their first thought was to construct with the typical design of **PLATE GIRDER**® sides and soffit, but were faced with the challenge of complex rebar issues. This warranted a work platform as the best option. Using **E-Z DECK**® for the support and work platform, along with **PLATE GIRDER** side

forms, Conti's crew was able to cycle the shoring and side forms with minimal breakdown. This enabled them to improve labor productivity and ultimately stay on target with their production schedule. ♦

Keith Abt..... Project Manager  
Brandon Hood ..... Project Engineer  
Manny Henriques. General Superintendent  
Kevin Clark..... General Foreman  
Vincent Vergona. EFCO Sr. Territory Manager  
Lou Szabo ..... EFCO Sr. Field Supervisor  
Jacquelyn Ewald..... EFCO Engineer



*EFCO's PLATE GIRDER® system provided a smooth, architectural finish.*







# SOLUTION ALLOWS WORK TO CONTINUE IN RAINY SEASON

Ratchaburi, Thailand

## APPROACH STRUCTURES

Most of Thailand's roughly 2,485 mile (4,000 km) rail network is a single track. A government initiative to move air and road transport to rail passed a major milestone on December 28, 2017 when the State of Railway Thailand (SRT) signed nine contracts with private contractors to complete the double tracking on 436 miles (702 km) of the SRT network. This phase one of the double-tracking project will cost US\$2.19B (69.5 billion baht).

The double tracked southern line, Nakhon Pathom to Hua Hin, is a major part of the phase one investments with a total length of 169 km. The government's objective is to reduce the nation's logistical overheads, approximately US\$55B (1.75 trillion baht), by moving air and road freight to rail. Moving a 1.1 ton (1 tonne) of freight by rail costs 0.05 US\$/mi (.93 baht/km) compared to 0.09 US\$/mi (1.72 baht/km) by road. As of the contract signing date, 86% of Thailand's freight is moved via road and only 2% by rail. This needs to change dramatically.

## VALUE OF EFCO PRODUCTS

The construction of "U-turn" elevated bridges are part of this "double track" project and would allow U-turning traffic without crossing the railway. The total number of "U-turn" bridges needed is 31. A single U-turn bridge consists of 12 pier caps with dimensions of 30'-3" (9.2 m)L x 4'-2" (1.265 m)H x 13'-2" (4.0 m)W, with a range of pier heights varying from 10' (3.00 m) to 28' (8.50 m). To eliminate

placing the footing on compacted soil, **KUNKRIT Construction** decided to use EFCO's solution of **E-Z DECK®** shoring combined with **SUPER STUDS®**. EFCO Thailand designed a temporary support below the shoring system by cantilevering **SUPER STUDS** off the footing to receive loading from the E-Z DECK shore post. Therefore, the entire shoring load was transferred to the footing.

Thailand's tropical climate means almost eight months of rain per annum. During the rainy season, contractors typically stop any work which involves the soil. The competitor's solution required shoring towers to sit on compacted soil at the footing. In which case, the competitor would have to stop setting up equipment and wait until the rain stopped. Using EFCO Thailand's solution of E-Z DECK and SUPER STUDS, KUNKRIT Construction was able to move forward with the project without any concerns for the strength of soil below, despite the rain. With this solution, KUNKRIT was able to save valuable construction time and saved money in the process.

## ADAPTABILITY AND STRENGTH

The adaptability and strength of E-Z DECK shoring was able to resolve the wide range of needed shoring heights which varied from 10' (3.00 m) to 28' (8.50 m). The E-Z DECK system consists of U-Heads, **Z-BEAMS**, **E-BEAMS**, E-Z Bracing Panels and E-Z Shore Posts which come in varying lengths; plus, the long jacks provide 5" (125 mm)

to 38" (965 mm) height adjustments. When combined, the E-Z DECK® system enabled KUNKRIT to achieve every shoring height they required. Additionally, EFCO's maximum post capacity of 28 kip (124.5 kN) per post enabled the tower to have fewer legs. This required less assembly time and provided more cost savings to KUNKRIT Construction.

EFCO E-Z DECK shoring was able to accommodate a pier cap with a 5-degree slope by using double Z-BEAMS® which could carry more load. To achieve the needed slope, KUNKRIT Construction inserted a hardwood wedge between the U-HEAD and the double Z-BEAM. This

enabled the contractor to reduce built-up inclining bottom forms, which saved cost and time once again.

The project was completed in four days using six workers, which translated into a savings of 20-30% of the budget. EFCO's solution was the clear winner for KUNKRIT Construction. ◇

Orathai Saree .....Owner  
Pinyo Thongkib ..... Project Manager  
Rittikai Songtong ..... Project Engineer  
Veerayut Ponsetmatargul ..... EFCO Territory  
Manager

Rakchat Nimpila ..EFCO Field Supervisor  
Paphakorn Tawatpeerachai. EFCO Engineer



**EFCO SUPER STUDS®** were used below the **E-Z DECK®** shoring system. This allowed work to continue during the rainy season in Thailand without any concerns of not working on solid ground.



# TOOLBOX TALK

## NEW EFCO FORM RELEASE BY NOX-CRETE



nox-crete

### INNOVATION

EFCO is dedicated to identifying the needs of contractors worldwide by developing and supplying innovative, high-quality concrete forming solutions. As EFCO continues to move forward and develop new and improved ways to meet the needs of an ever-changing industry, we have partnered with Nox-Crete, an industry leader in the development and supply of concrete construction chemicals, to develop new form coatings formulated specifically for EFCO and EFCO formwork.

### PRODUCT INFORMATION

EFCO Form Release by Nox-Crete is a new petroleum-based, general purpose form release agent that can be used on both steel and plywood forming surfaces. The ingredients chemically bond to the face sheet of EFCO's steel forms to produce a water-resistant film that provides temporary protection between pours. This protective film will ultimately react with the lime present in the concrete to provide a crisp, clean release and prevent the accumulation of concrete build-up. Despite being a petroleum-based product, EFCO Form Release by Nox-Crete has a 250 VOC level and is compliant for use in all of the United States and Canada with the exception of the four counties in southern California that make up the South Coast Air Quality Management District.



Available in 5-gallon buckets and 55-gallon drums.

### ESTIMATED AMOUNTS NEEDED FOR APPLICATION

EFCO Form Release by Nox-Crete can be applied to both steel and plywood forming surfaces. For plywood surfaces, the recommended application rate is 600-800 square feet per gallon. For steel face sheets, the recommended application rate is 1,500 square feet per gallon.

### PREFERRED APPLICATION SUPPLIES

As with all form release agents, for best results EFCO Form Release by Nox-Crete should be applied to a clean, dry-forming surface with the preferred method of application being a sprayer. There are a number of sprayers on the market that can be used to apply this product. Both high-pressure and low-pressure sprayers can be used as the performance of the coating applied will be dictated by the coverage rate.

If applying in temperatures below freezing, a high-pressure sprayer is recommended. If you are using a high-pressure sprayer such as the Nox-Crete Perfect Sprayer, the correct application will be achieved by spraying a very fine mist. If you are using a lower-pressure sprayer such as a Chapin 1949 Sprayer, you will have to move quickly to avoid over application. EFCO recommends you use an 8001 LP



*For best results, apply EFCO Form Release with a sprayer.*

nozzle for both the Nox-Crete sprayer and the Chapin sprayer, available from Nox-Crete or EFCO. Nox-Crete and EFCO also provide an adapter to be able to use the nozzle on a Chapin sprayer. **Contact your EFCO Wrap-Around Support Team for assistance in selecting the right sprayer and attachments for your situation.**

*Continued on page 76...*



*Begin by wiping the surface of formwork with a clean rag or burlap sack.*



# 3 WEEKS OF PROTECTION



*Begin spraying at the top of the form and apply a very thin and even coat.*

... Continued from page 75

## PRE-APPLICATION ADVICE

It is recommended the release agent be put on as thin as possible while still being able to achieve complete coverage. A good identifier to know if you are applying the form release too heavy is if there are visible runs or drips on the surface during or after application. If the release agent is sprayed on thick or uneven, it is recommended to run a microfiber mop

across the face of the form immediately after it has been sprayed. This will help ensure that the form is evenly coated and will remove any excess release agent. It is important to note that **over application of any suppliers' release agent on the forming surface can result in a poor or unacceptable concrete finish including discoloration, air pockets, and often bug holes.**



*Apply the release agent as thin as possible while still being able to achieve complete coverage. Application of release agent has been applied too thick in the picture shown above. Make sure there are no visible runs or drips on the surface during or after application.*



*For best results, after applying the release agent, use a microfiber mop to ensure a nice even coating. This will also help eliminate drips and runs.*

## SURFACE PREPARATION AND APPLICATION

The success of the product begins with proper application. Begin by wiping the surface of the formwork with a clean rag or burlap sack. Using a sprayer containing form release, begin spraying at the top of the form and apply a very thin and even coat. EFCO Form Release by Nox-Crete is designed to withstand foot traffic as well as precipitation. However, for best results, avoid walking on or wiping through the release agent which can have an effect on the evenness and performance of the release agent.

## 3 WEEKS OF PROTECTION

EFCO Form Release by Nox-Crete has been designed to provide up to three weeks of form protection without the need to be reapplied. If the release agent application has been directly exposed to the elements, particularly sunlight, for more than three weeks, then a second application of the same release agent will be required. **When formwork needs to be stored outdoors for longer periods of time without pouring concrete, EFCO's Wrap-Around Support Team and Nox-Crete are available to help you identify the right protective coating.**

It is recommended that all users read and thoroughly understand the instructions supplied with the product in order to realize the high-quality finish achievable with EFCO formwork.

[CLICK TO VIEW VIDEO](#)





# EFCO'S HANDSET SOLUTION...

# HAND-E-FORM®

*A forming system with versatility, forming quality concrete with minimum labor. The EFCO HAND-E-FORM® system is the system of choice.*



## USA - Stadium/Arena

Contractor: Kiewit  
Project: UNO Baseball Fields  
Location: Omaha, Nebraska



## Argentina - Civil/Industrial

Contractor: Astori Construcciones  
Project: Radio Telescope Base  
Location: San Juan, Argentina



## Colombia - Home Building

Contractor: Compañía de Constructores  
Asociados C.A.S.A.  
Project: Xoaca Zafiro  
Location: Nemocon, Cundinamarca,  
Colombia







### United Kingdom - Oil/Energy

Contractor: Firbeck  
Project: Spaldington Bio-gas AD Plant  
Location: Near York, England



### USA - Home Building

Contractor: CSA Concrete Construction, Inc.  
Project: Custom Home  
Location: Dallas, Texas



### Colombia - Home Building

Contractor: Atlantis Constructora  
Project: Bello Horizonte  
Location: Sincelejo, Sucre, Colombia



### Argentina - Commercial/Highrise

Contractor: Creaurban SA  
Project: Terrazas de Barrio Parque  
Location: Barrio Parque, Buenos Aires,  
Argentina



### USA - Civil/Industrial

Contractor: Avison Construction, Inc.  
Project: Owens Mountain  
Parkway  
Location: Clovis, California



### United Kingdom - Commercial/Highrise

Contractor: Roman Ground Works, Ltd.  
Project: Retaining Wall  
Location: Devizes, Wiltshire, England





# LIVING CORE VALUES



SwapLoader always strives to keep our commitment in offering the highest quality hook lift hoist in the industry. Our core values: Innovation, Integrity, Quality and Super Service are practiced daily. The company's dedication to this end requires a responsibility to go beyond simple conversations, product tracking and office calls. It means getting out in the field, experiencing the conditions and interacting with operators.

A recent trip to Guatemala demonstrates SwapLoader's commitment to these values. In October, the SwapLoader Team traveled there to meet with our distributor and customers. First on our agenda was supporting our local SwapLoader distributor, International of Guatemala, at the African Palm Conference (GrePalma). Here, the SwapLoader Team visited with current and future customers.

From there, the SwapLoader Team traveled with our distributor to a remote area of Guatemala's north central region, Alta Verapaz, where we met with a customer who had purchased 24 SwapLoader hook lift hoists over recent years. This meeting offered everyone involved—the SwapLoader team, operations managers, maintenance personnel, and equipment operators—an opportunity to talk about and view the equipment in action to better understand how the harsh environmental conditions in this region are and how they affect SwapLoader equipment.

SwapLoader is committed to providing super service and quality products to our distributors and customers and remains loyal to our core values. ♦



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