FORM MARKS®

SUMMER 2021

SEVENTY YEARS

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FORM MARKS®
SUMMER 2021
Volume 70, No. 2

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

Let's talk:
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Change of Address
New Subscriber Requests

Please include an address, telephone number and email address on all letters and inquiries. We reserve the right to edit letters for clarity, style and space and to use them electronically and in print.

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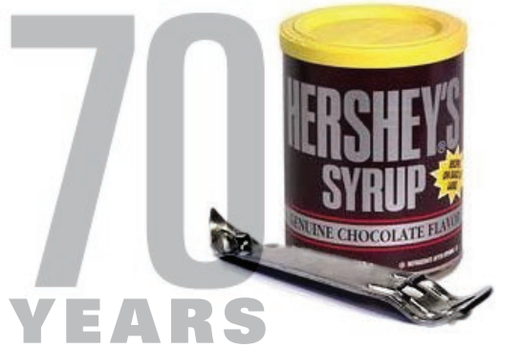
These quotes can be seen throughout FORM MARKS. They contain customer feedback given to EFCO Field Supervisors at the jobsite.

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.



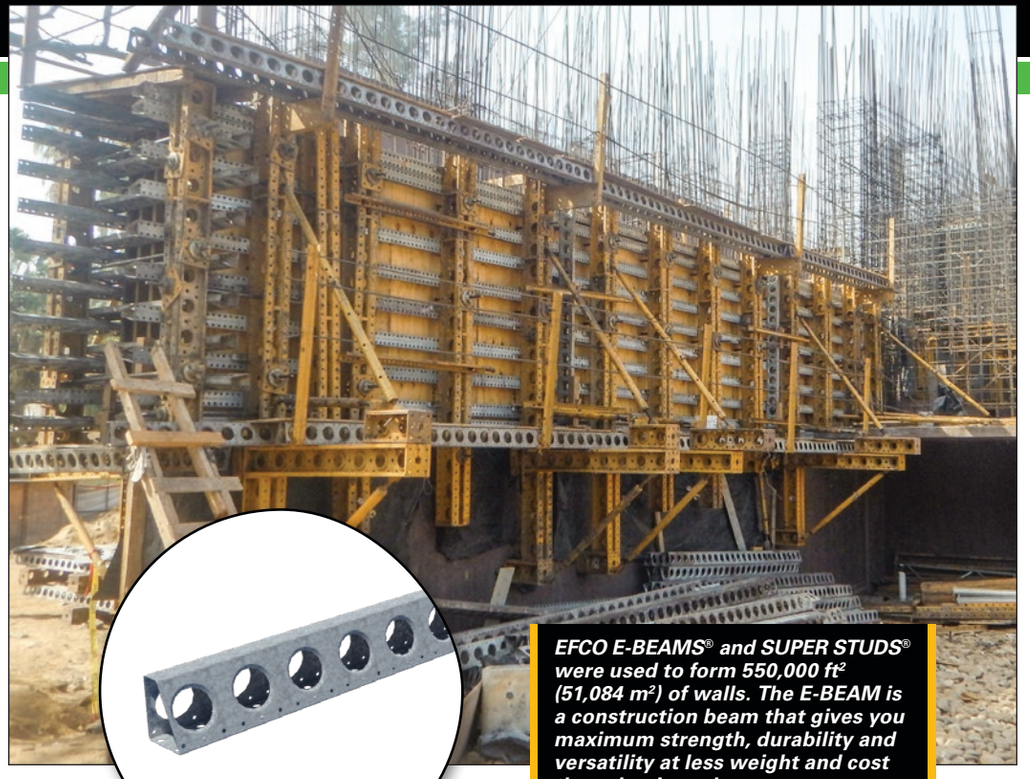
As you noticed by this issue's cover, FORM MARKS turns 70 this year. What a benchmark! Seventy years equates to 840 months, 25,550 days and more minutes than my TI-1795SV can display. Back in 1951, a new house cost just over $9,000 and a gallon of gas was $.20. Hershey's Syrup, that little can of chocolaty goodness that opened with a "church key," is a required staple in my house and cost my grandmother just $.17 in 1951. A lot has changed and evolved over the past 70 years; my Hershey's Syrup now can come in a 16 oz squeezable bottle with a flip top lid and can cost close to $4.00 each. I wonder if Milton Hershey saw that coming – I bet he didn't. I bet that his only focus was to make the best chocolate syrup on the planet, and in my book, it is the best.

My point is that evolution takes place before our very eyes and we might not even notice what is changing. As another example, FORM MARKS has changed a lot in the past 70 years. A lot of incremental changes but some big ones too. Like when it went from an employee newsletter to the reader digest sized magazine mailed to EFCO customers. How about going from one-color to full-color printing? Those changes were huge in their day. Perhaps unexpected and maybe proof positive that EFCO was indeed keeping up with the times with such leaps of evolutionary brilliance. Perhaps readers of FORM MARKS remarked to themselves, "this is great, what took them so long?"

I wonder what the next year will bring. I wish I was going to be around for the next 70!
Thanks for being a fan.

Cathy Howell
VP & Director of Advertising

EFCO Formwork Technology – Making the Impossible Simple



E-BEAM

EFCO E-BEAMS® and SUPER STUDS® were used to form 550,000 ft² (51,084 m²) of walls. The E-BEAM is a construction beam that gives you maximum strength, durability and versatility at less weight and cost than aluminum beams.

A SPECTACULAR ATTRACTION

Located within the Central Park in the City of Mazatlan, Sinaloa, the new Mazatlan Aquarium attraction, also known as Mar de Cortés, will become the largest aquarium in Latin America. It is planned to be done in September 2021. With a public and private investment of more than 70 million dollars, 27 companies from the city, 6 international companies and 34 national companies are working on the project, all of them under the general supervision of Kingu Mexicana. **Meprosa Construcciones** is in charge of the construction of the project while the architectural direction belongs to Tatiana Bilbao Estudio.

COMMERCIAL BUILDING CONSTRUCTION

With an area of more than 540,000 ft² (50,000 m²), the spectacular three-level commercial building and 260,000 ft² (24,000 m²) of structure will have 19 exhibition rooms and four interior courtyards. The most important exhibits will be the oceanic tank with almost 1.8 million gallons (7 million liters) of water and a coral tank.

FORMWORK AND SHORING FOR CONCRETE SLABS, COLUMNS AND WALLS

The project has two main elements consisting of slabs and walls. The walls, measuring 8" (20 cm) in thickness, have an air chamber filled with thermal insulation measuring 2' (60 cm) thick. The three slab levels have floor to ceiling heights of 20' (6 m). These 23' sq (7 m sq) slabs are 1' (30 cm) thick and either rested on walls or columns.

EFCO FORMWORK TECHNOLOGY

The formwork technology being used on this project: EFCO supplied 36,000 ft² (3,343 m²) of aluminum shoring system—**E-Z DECK®**, at a height of 20' (6.00 m), for the construction of 260,000 ft² (24,000 m²) of slabs and 17,500 ft² (1,624 m²) of EFCO's **E-BEAM®** and **SUPER STUD®** system for the construction of 550,000 ft² (51,084 m²) of walls.

HIGH-QUALITY CONCRETE FINISH AND SAFETY STANDARDS

In the construction industry, there is an increased need for efficiency while meeting safety demands. Backed by outstanding formwork technology and engineering expertise, EFCO fulfills these needs.

Some of the project requirements EFCO faced when contracting the project were:

- **SAFE** Formwork Solution: A formwork system with built-in safety features to meet safety standards.
- **AGILE** Formwork Solution: Formwork capable of efficient assembly that cycles quickly and requires fewer workers, reducing the production time of the project.
- **PRACTICAL** Formwork Solution: Equipment that is easy to assemble, has fewer pieces, covers a large area with fewer elements and is also lightweight!
- **QUALITY** Formwork Solution: The equipment needed to deliver a high-quality concrete finish.

A meticulous study of the project, the versatility, safety and load capacity of EFCO's equipment along with the advice and help from the experts at EFCO, guaranteed Meprosa Construcciones would achieve the lowest in-place concrete cost.

PROJECT LOCATION

Mazatlan, Mexico

EFCO EQUIPMENT

E-Z DECK®, E-BEAM® and SUPER STUD®

MEPROSA CONSTRUCCIONES TEAM

Héctor Manuel López Gaona ..... Project Manager
Sebastián Arana Escobar ..... Chief Operation
Ángel German Morquecho Polanco ..... Construction Manager
Héctor Manuel López Gaona .. Crew Leader

EFCO FORMWORK SPECIALISTS–MEXICO

Julián García ..... Territory Manager
Francisco Islas ..... Field Service Manager
Francisco Ortega ..... Engineer

HOW TO CONNECT

https://meprosaconstrucciones.mx/

Productivity Realized in Mall Construction

THE LARGEST SHOPPING MALL IN THAILAND

The Mall Group, who is one of Thailand's largest mall operators, is developing a new mixed-use property project with an investment of around US$897 million (30 billion baht). The new project, which is being constructed in the Eastern zone of Bangkok, is being built on 39.5 acres (100 rai) (16 hectares) of land opposite the Bangkok International Trade and Exhibition Centre (BITEC). They will spend around US$598 million (20 billion baht) to develop 31.6 acres (80 rai) (12.8 hectares) of land for the Bangkok Mall, the largest shopping mall in Thailand and Southeast Asia. Then US$299 million (10 billion baht) will go toward creating an office building, a hotel and a service apartment which will consume the remaining 7.9 acres (20 rai) (3.2 hectares) of land and operate under the Chatrium brand.

MINIMAL SACKING OF JOINTS AND PATCHING OF TIE ROD HOLES

Italian-Thai Development PLC. (ITD), who is the largest contractor in Thailand, chose to use EFCO's all-steel ***PLATE GIRDER***® forming system to form the square columns for the Bangkok Mall. The columns range in sizes of 48" x 48" (1200 x 1200 mm), 44" x 44" (1100 x 1100 mm) and 36" x 36" (900 x 900 mm) with 24' (7.20 m) pour heights and use standard EFCO equipment. A benefit of the *PLATE GIRDER* system is that it is able to form these big columns without any additional bracing or walers. The use of *PLATE GIRDER* forms has also significantly increased productivity for the contractor at the jobsite because there are no plywood face sheets to change out, no bracing and no tie rods required. EFCO's windmill design, used when forming the columns, creates an opportunity to form variable sizes without additional equipment. Plus, the all-steel face sheet of the *PLATE GIRDER* system provides an architectural finish pour after pour and with minimal sacking of joints and patching of tie rod holes. These unique system features and quality concrete finishes are new to Thailand.

EFCO'S HANDSET STEEL FORMWORK SYSTEM

The substructure of the Bangkok Mall consists of several concrete structures: retaining wall, curved wall, water tank, core walls and footings. These structures come with some limitations. First, the contractor required a handset steel formwork system because they needed to reduce the workload of the crane; plus, the crane was unable to access some of the locations. Additionally, they expected an architectural concrete finish and formwork that was efficient and durable. **HAND-E-FORM**® panels are capable of withstanding 15'-6" (4.70 m) height pours in one cast, pour after pour.

8 ►

The EFCO PLATE GIRDER® system is able to form these big columns without any additional bracing or walers.

HANDSET FORMWORK SOLUTION

Thus, the best solution for meeting the client's requirements is the HAND-E-FORM® system. This handset formwork system is a versatile construction solution. Since the panel is comprised of a lightweight steel alloy face sheet which extends to the edge of panel, it provides only a single joint impression, producing a consistent quality concrete finish.

EFCO STANDARD ACCESSORIES FOR EVERY REQUIREMENT

The HAND-E FORM system uses standard accessories. This forming system requires less spreader ties, with a 24" x 24" (600 mm x 600 mm) spacing. Spreader ties are used to keep the forms together when the pour is taking place. Each spreader tie also has a breakback function which enables a worker to easily hit and break off protruding ties after the forms are removed. Spreader tie plastic cones, used in conjunction with the spreader ties, permit the breaking off of the tie ends with minimum spalling of concrete. Even if a concrete structure needs to be water tight, such as a water tank or retaining wall, it is possible to prevent leakage by placing EFCO's Spreader Tie Rubber Waterstop on each spreader tie without any additional equipment. When you combine the many benefits of the HAND-E-FORM system, it is an outstanding forming system.

PROJECT SOLUTION DESIGN TEAM WINS WITH A SATISFIED CUSTOMER

EFCO's Project Solutions Design Team can advise on the most appropriate solution considering the individual requirements of the project. By using this information, they can propose the most cost-effective solution, considering both the budget and timescale constraints of the project. The project director and manager of the Bangkok Mall were really satisfied and appreciated EFCO products and services as they recommended EFCO to another contractor. EFCO appreciates their business and recommendations to others!

The EFCO Plate Clamp is used to hold HAND-E-FORM® panels together. It has a dowel pin that goes through the flange holes to align the panels and the jaw comes down to lock them together. This is a fast and efficient one-piece connection.

PROJECT LOCATION

Bangkok, Thailand

EFCO EQUIPMENT

PLATE GIRDER®, HAND-E-FORM®

ITALIAN-THAI DEVELOPMENT TEAM

Damrongsak Janmi.....Project Director
Kamrob Rungrueng .....Project Manager
Arkhom Benjarattana .....Project Manager

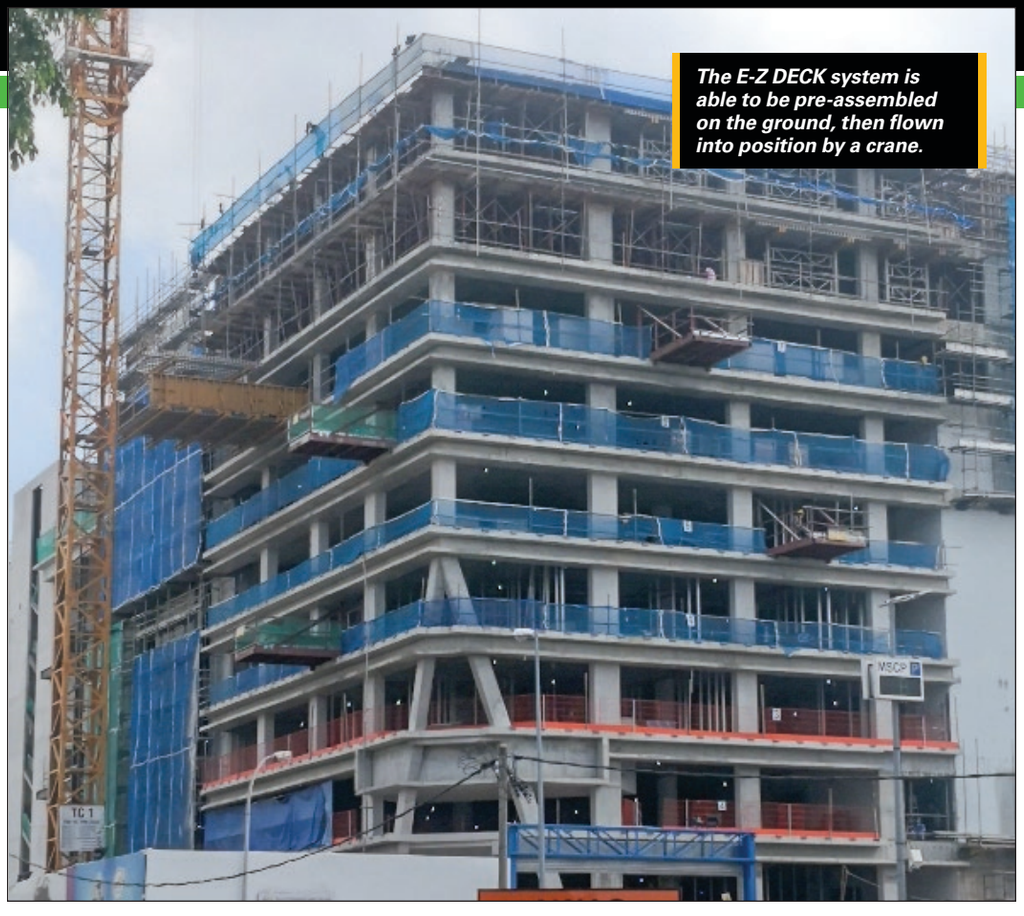
EFCO FORMWORK SPECIALISTS–THAILAND

Veerayut Ponsetmatargul . Territory Manager
Rakchat Nimpila ..... Field Supervisor
Jeanna Fernandez..... Engineer

HOW TO CONNECT

https://www.itd.co.th/

E-Z DECK Towers Cycle Quickly



The E-Z DECK system is able to be pre-assembled on the ground, then flown into position by a crane.

GROWTH CALLS FOR NEW CONSTRUCTION

Infineon Technologies AG is a world leader in semiconductor solutions producing microelectronics. In the 2020 fiscal year, Infineon reported revenue of more than US$10 billion (€8.5 billion) with a workforce of 46,700 people worldwide. Following the acquisition of the US company Cypress Semiconductor Corporation in April 2020, Infineon is now a global top 10 semiconductor company.

Alongside the growing scale of business, Infineon is expanding its current production plant in Melaka, Malaysia to fulfill its growing number of employees. The building is designed and built by Nakano Construction Sdn. Bhd., while the concrete forming works was tendered to **Laubros Holding (M) Sdn. Bhd.**, a well-known construction company in the Southern region of Malaysia.

CONSTRUCTION COMPLETED ON SCHEDULE

The total build-up area of this new 11-story office tower building is approximately 150,000 ft² (14000 m²). The structure work of the building had an expected completion date of late May 2020, which was successfully completed on time, even under the effects of the COVID-19 pandemic lockdowns.

PROPS IN CONSTRUCTION

EFCO Malaysia supplied aluminum props and formwork for the construction of the entire building structure. Specifically, EFCO's **E-Z DECK®** towers were used to prop the floor slabs, and ***PLATE GIRDER®*** forms made up the loading platform. The floor heights vary from 12'-2" (3.7 m) to 24'-4" (7.4 m), with an area of 13,500 ft² (1250 m²) per floor. Each floor slab was divided into two concrete pours with a single joint.

A feature of EFCO's E-Z DECK system is its ability to be pre-assembled on the ground, then flown into position by a crane. This feature significantly enhanced erection efficiency and flexibility on site and provided a safe environment for the workers. The large capacity loading platform, where the E-Z DECK towers were cycled and moved using Crazy Wheel Dollies, was constructed of all-steel forms—*PLATE GIRDER*.

Laubros Holding is very pleased with EFCO's super service and the expertise provided by EFCO Field Service Supervisors on site during this project. It helped make a safer and more efficient jobsite. ◊

PLATE GIRDER panels made up the platform where E-Z DECK towers were loaded and cycled.

PROJECT LOCATION

Batu Berendam, Melaka, Malaysia

EFCO EQUIPMENT

E-Z DECK®, *PLATE GIRDER®*

LAUBROS HOLDING TEAM

Lau Kok Sian.....Project Manager
Suhaimi B. Majasan. Project Superintendent
Zarif Haikal B. Zainal..Project Safety Officer

EFCO FORMWORK SPECIALISTS–MALAYSIA

Andhi Irawan.....Territory Manager
Johnson Chai.....Field Supervisor
Kevin Khor..... Engineer

HOW TO CONNECT

http://laubros.com/

Steel and Aluminum Materials Eliminate Need for Plywood Formwork

MANAGING STORMWATER OVERFLOW TO PENOBSCOT RIVER

The Davis Brook Combined Sewer Overflow (CSO) Project located in Bangor, Maine will manage stormwater overflow and seasonal melt from entering the Penobscot River. This development will mitigate environmental impacts to local and statewide resources, which is a big step in Maine's resource preservation and stormwater management best practices.

ENGINEERING FORMWORK DESIGN FOR CONCRETE STORAGE TANK CONSTRUCTION

The Davis Brook CSO Project consists of the development of a 3.8 million-gallon (14.4 million-liter) storage tank along the Penobscot River. It measures 242' x 116' (24 m x 36 m). The estimated Project Cost is $32 million and is projected to be completed in Fall 2021. The project has been a successful team effort with close communication between **SE MacMillan**, VR Concrete and EFCO Corp. EFCO Field Service representation and engineering formwork design was superior. EFCO engineers played an important role in the success of every phase of the project.

CONCRETE FORMING AND SHORING SYSTEMS UTILIZED

SE MacMillan Company had great success utilizing EFCO's all-steel **Round Column®** and custom column capital formwork, plus **E-Z DECK®** shoring equipment. These concrete forming and shoring systems offered quick assembly, stripping, and cycling within the respective phases of the CSO structure. The E-Z DECK shoring system provided rigidity, versatility and a safe working deck for concrete placements.

FORMWORK SOLUTIONS FOR EVERY PROJECT

EFCO offers a wide variety of concrete forming systems and products that enable any construction crew to quickly handle both standard and complex forming situations. EFCO's industry leading products, engineering expertise and jobsite services will provide you with the most efficient and effective formwork solution for the application.

A WELL-ENGINEERED SOLUTION

With a wide range of products and EFCO's talented engineering team at your side, a well-engineered solution is certain. Why trust anyone else! ◊

Ganged E-Z DECK shoring and decking can be moved from one place to another without system tear down and reassembly.

EFCO Round Column® forms are available in diameters from 12" (300 mm) to 144" (3600 mm).

PROJECT LOCATION

Bangor, Maine

EFCO EQUIPMENT

Round Column, E-Z DECK®

SE MACMILLAN TEAM

Stan MacMillan .....President
Rick Merrithew.....Superintendent

EFCO FORMWORK SPECIALISTS–NEW ENGLAND

Matt Taylor.....Territory Manager
Lou Szabo .....Sr. Field Supervisor
Joel Lindberg ..... Engineer

All-Steel Gang Form System Achieves a Quality Concrete Finish in Less Time

NEW CSO TANK CONSTRUCTION HELPS CITY OBTAIN BETTER WATER QUALITY

Leeward Construction, Inc. broke ground on Pennsylvania American Water Company's newest stormwater overflow tank, the Washburn Combined Sewer Overflow (CSO), in the spring of 2020. The tank was completed in accordance with PAWC's Scranton (CSO) 25-year Long-Term Control Plan program for the purpose of significantly reducing combined sewage overflow and ultimately 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 at an estimated total cost of $140M. This specific project will reduce the annual average number of combined sewer overflow events at the CSO 22 regulator. During wet weather events, the new storage tank will capture the combined sewage overflow that would normally be discharged into the nearby waterways and tributaries 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.

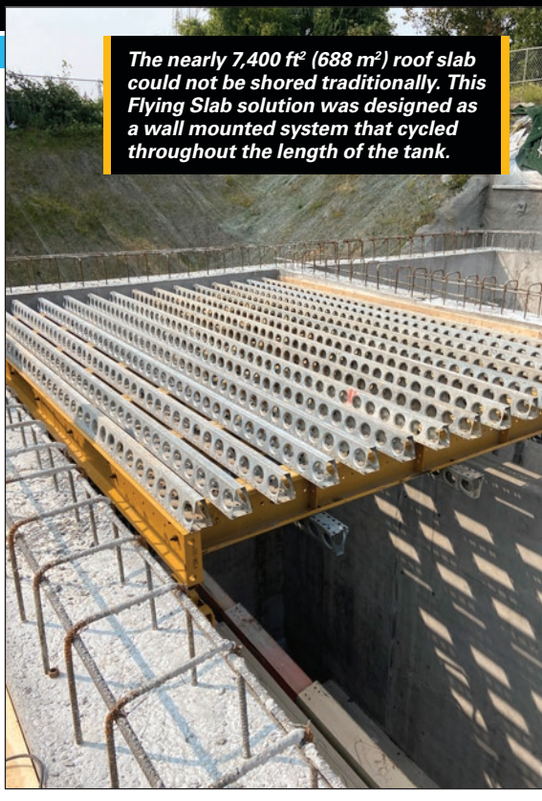
BUILDING A TANK WALL WITH FORMWORK – NOT JUST A FORMWORK SOLUTION

The CSO is the latest in the city of Scranton, Pennsylvania. The project faced challenges amidst the Coronavirus pandemic but started on time and completed on schedule in late 2020. With the experience of recently completing the Prescott CSO in 2019, EFCO engineers where chosen to work with Leeward on this project. The project's primary structure is—forming the Combined Stormwater Overflow tank wall, which measures 202'-10" (61.8 m) long, 37' (11.3 m) wide with 28' (8.5 m) tall maximum walls.

FORMWORK CONSTRUCTION FOR WALL FORMWORK SYSTEMS

EFCO has developed a portfolio of formwork systems that are for lease and sale and specifically met this project's requirements. To keep the project on schedule, Leeward needed formwork that was easily ganged and cycled in large sections for this construction project. Using all-steel panels and minimal ties, the ***PLATE GIRDER***® gang form system was once again the right solution to help Leeward place the 28' (8.5 m) tall concrete walls.

All-steel PLATE GIRDER® panels use minimal ties and are easily ganged and cycled in large sections for the tank walls, measuring 202'-10" (61.8 m) long x 37' (11.3 m) wide and 28' (8.5 m) tall.



The nearly 7,400 ft² (688 m²) roof slab could not be shored traditionally. This Flying Slab solution was designed as a wall mounted system that cycled throughout the length of the tank.

FLYING SLAB FORMWORK CONSTRUCTION

The nearly 7,400 ft² (688 m²) roof slab provided a challenge and could not be shored traditionally. EFCO, thinking out of the box, offered the Flying Slab system for the construction. This proved to be the perfect answer. EFCO's slab construction solution would support the weight during the curing process. This Flying Slab solution was designed as a wall mounted system that cycled throughout the length of the tank. This system offered Leeward their fastest elevated slab cycling production rates they have ever achieved. Why trust anyone else! ◊

PROJECT LOCATION
Scranton, Pennsylvania

EFCO EQUIPMENT
PLATE GIRDER®, FLYING SLAB

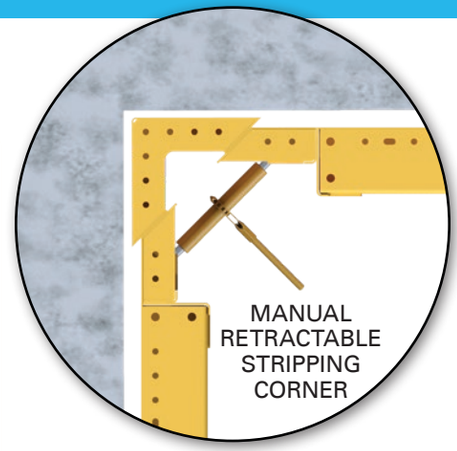
LEEWARD CONSTRUCTION TEAM
Matt Green.....Project Manager
Mike Bonham.....Superintendent

EFCO FORMWORK SPECIALISTS–PITTSBURGH
Zac Boda .....Territory Manager
Rick Lynch.....Field Supervisor
John Lust..... Engineer

HOW TO CONNECT
https://www.leewardconstruction.com/

EFCO System Works With Contractor Supplied Plywood Formwork

> *Using EFCO E-BEAM® and SUPER STUD® gang wall forms has helped us reach our production goals, produce great quality concrete, and create less tie holes than the competition. EFCO's equipment ships efficiently and has limited build-up time on site.*
>
> *Scott Hamby*
> *General Superintendent*



EFCO's Manual Retractable Stripping Corner was used to provide stripping relief on the inside forms.

EXPANSION OF AIRPORT WATER RECLAMATION FACILITY

The expansion of the Airport Water Reclamation Facility (WRF) will increase it from a permitted capacity of 3.5 million gallons per day (MGD) [13.2 million liters per day (MLD)] to 6 million MGD (22.7 million MLD). The expansion is needed to close the Spring Hill (Osowaw) wastewater treatment plant (WWTP). Built in 1969, the Spring Hill WWTP has out-of-date technology that does not nitrify nor denitrify wastewater. When the airport treatment plant expansion is complete, Hernando County will divert the wastewater — via underground pipes down County Line Road — to the new site and take the Osowaw plant offline.

WALL FORMWORK

Phase III of the expansion is the construction of a new Step-Feed Biological Nutrient Removal (BNR) Basin. **Baker Concrete Construction** partnered with EFCO to complete this BNR Basin which consists of over 1,600 LF (490 m) of 18' (5.5 m) high cast-in-place two-sided concrete walls.EFCO's ***PLATE GIRDER®*** and **E-BEAM®** and **SUPER STUD®** systems were used in conjunction with contractor supplied plywood formwork. EFCO Rugged Taper Ties were used at the base of the walls, and Top Yokes at the top. Therefore, the walls only needed one tie every 35 ft² (3.3 m²), meaning less water stops and patching. Plus, using EFCO's Manual Retractable Corner provided for easy stripping and fast cycling times. Over 4000 ft² (370 m²) of walls were formed, poured, and stripped per week, equaling 12 cycles over a three-month period. ◊

PROJECT LOCATION
Brooksville, Florida

EFCO EQUIPMENT
PLATE GIRDER, E-BEAM AND SUPER STUD

BAKER CONCRETE TEAM
Marco Onate.....Superintendent
Jackie Jimenez.....Project Manager

EFCO FORMWORK SPECIALISTS–ORLANDO
Doug Whipple.....Territory Manager
Frank Bonventre.....Sr. Field Supervisor
Alec Gilbert.....Engineer

HOW TO CONNECT
https://bakerconcrete.com/

RUGGED TAPER TIE

EFCO's 1" (25 mm) diameter Rugged Taper Ties, used with E-BEAM and SUPER STUDS, can support up to a 30 kip (133.4 kN) tie load and do not require sleeves. Simply grease the tie prior to placement of concrete and the tapered shaft of the tie allows for quick and easy removal the next day.

Circular Wall Formwork Shapes Clarifier Tanks

EFCO's flexible REDI-RADIUS® system can adapt to any curve.

PROJECT PURPOSE

This construction project is to increase the Elsinore Valley Municipal Water District's ability to treat wastewater by 4 million gallons (15.1 million liters) per day. This upgrade is necessary to support the growing community in the Elsinore Valley.

REDI-RADIUS SYSTEM FOR WALL FORMWORK

This project consisted of constructing four cast-in-place concrete round clarifier tanks using EFCO's curved wall formwork—the **REDI-RADIUS®** system. Each tank measures 150' (45.7 m) diameter x 18' (5.5 m) tall and was completed in eight pours of roughly 59' (18.0 m) long. Due to the high urgency for the project's completion, **Flatiron West, Inc.** was tasked with a very aggressive schedule. The Flatiron and EFCO teams developed a plan that provided efficiency in assembly and cycling of the formwork, enabling each of the four tanks to be completed in five weeks.

CURVED FORMWORK USED IN CONSTRUCTION

One of the benefits of using EFCO's flexible all-steel curved formwork system is a smooth, quality concrete finish. This adjustable system can also adapt to any curve, which allowed Flatiron's crew to easily shape and assemble panels into large gangs with minimal parts and pieces.

EFFICIENT CONSTRUCTION CYCLING

Combining the curved formwork panels into large gangs was crucial in minimizing the man-hours required to get the system from the truck to standing vertically and ready to pour. Once in place, the allowable pour rate of 1,400 PSF (67 kPa) enabled Flatiron's crew to achieve the aggressive schedule that had been established.

FORMWORK SCAFFOLDING SYSTEM

EFCO's scaffolding system, an accessory to many of EFCO's formwork systems, provided a safe work area for easy access to formwork, hardware and pouring operations. Scaffold Brackets attach to the REDI-RADIUS formwork quickly and easily and are used in conjunction with the contractor's scaffold planks, handrails and toe boards.

PLANNING FOR FORMWORK PENETRATIONS

Multiple pipe penetrations measuring up to 30" (760 mm) diameter through the tank walls had to be accounted for. By identifying these pipe penetration locations in the planning stage, EFCO was able to design and supply specific formwork panels to support forming around the pipes. ◊

PROJECT LOCATION

Lake Elsinore, California

EFCO EQUIPMENT

REDI-RADIUS®

FLATIRON WEST TEAM

Steve Cavaness ..... Project Superintendent
Mitchell Schwager ..... Engineer
Miguel Hernandez ..... Carpenter Foreman
Kevin Cole ..... Carpenter Foreman

EFCO FORMWORK SPECIALISTS–LOS ANGELES

Cody O'Neil ..... Sr. Territory Manager
Kristian Aguilar ..... Field Supervisor
Kyle Hamilton ..... Engineer

HOW TO CONNECT

https://www.flatironcorp.com/

> ***The project demands required an extremely fast turnaround on the 150' (45.7 m) diameter Clarifier Tank. With the support of Cody O'Neil, our team put together a plan to build this tank in record time. The construction team was able to achieve this aggressive schedule completing the eight wall sections in five weeks. Without the amazing effort and determination of Miguel, Kevin, and Mitchell our plan would have never came to fruition. In addition, the REDI-RADIUS system that EFCO provided is the best system for radius walls. It was easily shaped and ganged with a minimal number of pieces, minimizing the man hours needed to get the system from the truck to standing vertically ready for concrete. My pour crews especially appreciated the allowable pour rate on the formwork enabling them to meet the aggressive man/hour goals that we had established. This form system is the Cadillac of radius forming without the bloated price tag.***
>
> ***Steve Cavaness***
> ***Project Superintendent***

Circular Formwork for Concrete Cistern Tank Walls

CONSTRUCTION OF CONCRETE CISTERN TO INCREASE STORAGE

In 2020, the Aguas del Colorado SAPEM company started the bidding process for the construction of a cistern to increase the storage capacity of drinking water in the city of Santa Rosa, the capital of La Pampa province. This project was awarded to **ECOP Construcciones** who contacted EFCO because of their versatile products and expertise in the construction of tanks. Having these qualities on their side enabled ECOP Construcciones to meet a variety of forming requirements and find the best shoring and forming solution.

CURVED CONCRETE CISTERN TANK WALL

The project consists of a 116'-6" (35.5 m) diameter concrete cistern with 20' (6 m) high circular walls, divided in its interior by five straight partitions and closed by a 8" (20 cm) thick roof slab with a capacity to hold 1.3 million gallons (5 million liters) of potable water. It was scheduled to be built in a period of eight months.

With an estimated investment of US$ 1 million (AR$ 94 million), this project will significantly increase the city's potable water reserve capacity.

RELIABLE FORMWORK PARTNER

For the construction of this project, ECOP secured EFCO as a reliable formwork partner. The comprehensive and practical experience provided by EFCO Sales, Engineering and Field service made EFCO the trustworthy solution for the project.

FORMWORK FOR CONCRETE SLABS, WALLS AND CIRCULAR COLUMNS

EFCO's handset steel formwork, the **HAND-E-FORM®** system, was used to form the straight interior concrete wall partitions. EFCO's **Round Column®** system was used to form the circular columns. Then the flexible formwork system, **REDI-RADIUS®**, was used to achieve a perfect curvature and excellent finish of the exterior walls. This, together with the practicality of assembly and cycling, makes REDI-RADIUS the ideal system for circular walls. The high-capacity aluminum **E-Z DECK®** system, with its heavy-duty shore posts, was used in shoring the concrete slab on top of the cistern.

GOOD TEAMWORK MAKES THE PROJECT A SUCCESS

This was the first time ECOP had partnered with EFCO and, due to the excellent teamwork between both sides, the project could be completed in the scheduled time and with very satisfying results.

The project consists of a 116'-6" (35.5 m) diameter concrete cistern with 20' (6 m) high circular walls.

PROJECT LOCATION

Santa Rosa –La Pampa, Argentina

EFCO EQUIPMENT

HAND-E-FORM®, Round Column®, REDI-RADIUS® and E-Z DECK®

ECOP CONSTRUCCIONES TEAM

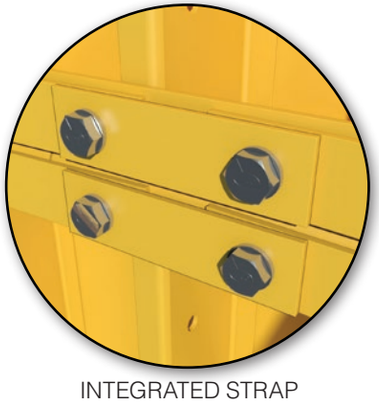
Pablo Pessi .....President
Fernando Peirone.....Technical Manager
Cesar Schiel .....Superintendent

EFCO FORMWORK SPECIALISTS–ARGENTINA

Gabriela Loveri .....Territory Manager
Agustin Saraceno .....Field Supervisor
Gaston Campagnolle ..... Engineer

HOW TO CONNECT

https://www.construar.com.ar/empresas/ecop-construcciones/



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).

EFCO Delivers a Formwork Solution for Cast-in-Place Concrete Stadium

CAST-IN-PLACE CONCRETE STADIUM RENOVATIONS

Jensen Builders was chosen to form and pour all of the cast-in-place concrete for the Jack Trice Stadium North End Zone Renovations in Ames, Iowa. The North End Zone Renovations, at Iowa State University, include modifying the northeast and northwest hillsides and building a pedestrian bridge that connects the stadium together at the north end.

VERTICAL WALL FORMWORK FOR THE RETAINING WALL

Jensen Builders started and finished the work for the northeast hillside retaining wall last summer using EFCO's vertical wall formwork. This spring, the ticket office behind the Jacobson Building was demolished to make way for the new pedestrian bridge. Once the demolition was complete, Jensen Builders then resumed work with the northwest hillside retaining wall using EFCO's vertical concrete wall formwork system. This renovation included modifying the tunnel from the locker room and the pedestrian bridge connecting the northwest and northeast sides of the stadium.

CAST-IN-PLACE CONCRETE RETAINING WALL CONSTRUCTION

The 1' (305 mm) thick cast-in-place concrete retaining wall, which connected into the stadium wall around the field, runs parallel to the Jacobson Building and gets as high as 25' (7.6 m) at the end where the wall connects into the pedestrian bridge.

BENEFITS OF CAST-IN-PLACE CONCRETE WALLS

Site-cast concrete walls provide the following benefits for a structure:

- Strength
- Safety & Reliability
- Energy-efficiency
- Ability to block sound
- Fire resistance
- Versatility

FORMWORK FOR CONCRETE STRUCTURES

Jensen Builders used EFCO's **E-BEAM®** and **SUPER STUD®** formwork for vertical wall gangs to form this staggered height concrete retaining wall structure. Jensen Builders then used EFCO's **REDI-RADIUS®** system to form the 14" (355 mm) thick radius wall along the northwest perimeter of the stadium.

DECK SHORING SYSTEM

Jensen Builders then used EFCO's E-Z DECK® shoring system to form the nearly 200' (61 m) long pedestrian bridge that runs behind the existing Jacobson Building at the north end zone and connects the stadium together from the northeast to the northwest sides.

EFCO engineering utilized 38 E-Z DECK shoring towers across the span of the 200' (61 m) long bridge. Jensen Builders then blocked out areas on top of the E-Z DECK with plywood to form the 2'-5" (735 mm) thick beams and the 6" (150 mm) thick slab of the pedestrian bridge.

MODULAR SYSTEM IMPROVED EFFICIENCY

Superintendent for Jensen Builders, Darrel Horgeshimer, was instrumental in assembling and modifying E-BEAM and SUPER STUD gangs to accommodate pipe penetrations throughout the northwest and northeast walls. In addition, Darrel and Jensen Builders were able to minimize their E-Z DECK tower assembly labor for the pedestrian bridge to help them achieve their lowest in-place concrete cost.

WHY TRUST ANYONE ELSE!

Darrel and Jensen Builders were great to partner with for the Jack Trice North End Zone Renovation, and EFCO's Des Moines District looks forward to working with them again in the future.

PROJECT LOCATION

Ames, Iowa

EFCO EQUIPMENT

REDI-RADIUS®, E-Z DECK®, E-BEAM® and SUPER STUD®

JENSEN BUILDERS TEAM

Darrel Horgeshimer. Project Superintendent
Alex Bonzer..... Project Manager

EFCO FORMWORK SPECIALISTS–DES MOINES

Zach Edwards..... Territory Manager
Matt Harrington ..... Field Supervisor
Nathan Witte..... Engineer

HOW TO CONNECT

https://www.jensenbuildersltd.com/

EFCO engineering utilized 38 E-Z DECK Shoring Towers across the span of the 200' (61 m) long pedestrian bridge.

Forming Long Spans of a Slab Bridge

EFCO PLATE GIRDER panels were used to self-span across the ditch.

CONSTRUCTION OF SLAB BRIDGE COMPLETE

Construction has been completed on a slab bridge located over Barnard Ditch in Demotte, Indiana. This 18" (455 mm) deep slab bridge consists of three skewed center-to-center spans: 30' (9.1 m) at the outer spans and 40' (12.2 m) at the center span. Slab bridges have been typically formed using a spanning member and a mid-support to handle the loads when spans are this great.

SLAB FORMWORK BRIDGE

Gariup Construction had to construct this immense slab formwork bridge over a ditch that local farmers use as a water overflow. Due to the water being used for crops and other purposes, Gariup Construction was prohibited by the State of Indiana to work in it. This project needed to be as efficient, economical and safe as possible. After hearing about EFCO's quality formwork for long span bridges, Gariup Construction selected EFCO to design and supply the sturdy slab formwork system to successfully make the spans without the need of a mid-support. A slab bridge differs from a traditional bridge in that there are no girders to support the deck. Meaning, the deck has to be the support between spans.

FASTER ASSEMBLY AND STRIPPING OF FORMWORK

In a short timeframe, the EFCO Design Team developed a solution using the EFCO ***PLATE GIRDER***® system. Known for its durability and spanning capability, the *PLATE GIRDER* panels were used to self-span across the ditch. EFCO **E-BEAMS**® were used in a truss-like fashion across the span of the *PLATE GIRDER* system to tie the panels together and to also give the contractor a member to secure their plywood to. Twelve of these setups were placed adjacent to one another to form the width of the bridge.

Taking down or stripping formwork is more efficient when using steel formwork, because it can remain ganged together, allowing more square footage to be removed per pick. Thus, EFCO's innovative design helped Gariup Construction assemble, form, and strip the slab bridge before the scheduled road opening date. ◊

> ***This is my first time using the EFCO system and it turned out to be a great system for this project.***
>
> ***Joe Kantowski***
> ***Superintendent***

PROJECT LOCATION
Demotte, Indiana

EFCO EQUIPMENT
PLATE GIRDER®, E-BEAMS®

GARIUP CONSTRUCTION TEAM
Joe Kantowski.....Superintendent
Darren Demaree.....Project Executive

EFCO FORMWORK SPECIALISTS–CHICAGO
Elijah Williams .....Territory Manager
Paul Huisinga.....Sr. Field Supervisor
Zachary Scholten..... Engineer

HOW TO CONNECT
http://www.gariup.com/

New Infrastructure Takes Shape

EFCO PLATE GIRDER® and Round Column forms were ganged together to shape the Bullnose piers.

HIGHWAY 401 EXPANSION

West Corridor Constructors (WCC) was awarded the design build of the Highway 401 project. WWC is an all-Canadian, fully integrated team comprised of Aecon Infrastructure Management Inc. (Aecon), Parsons Inc. (Parsons), and Amico Infrastructures Inc. (Amico). The project involves the widening and reconstruction of approximately 11.2 miles (18 km) of Highway 401 from east of the Credit River in Mississauga to west of Regional Road 25 in Milton.

EFCO supplied WWC with formwork and shoring to various areas of the 11.2 miles (18 km) expansion. EFCO supplied equipment included the ***PLATE GIRDER***® and **Round Column**® forms to create the Bullnose piers, the **ADJUST-A-DECK**® forms to support various pier caps and the **E-Z DECK**® shoring system to support the concrete slab deck.

ACCURATE PANEL JOINT ALIGNMENT

EFCO supplied six sets of the *PLATE GIRDER* and Round Column formwork to shape the Bullnose piers that have a max height of 28' (8.5 m). EFCO's high-strength alloy steel formwork is fixture built, maintaining dimensional accuracy and providing excellent panel joint alignment. This eliminates offsets and minimizes grout leakage. EFCO's forms also produce amazing high-quality concrete finishes. EFCO's form face plates run clear to the edge of every form panel, so you only get a single sharp line marking the form joint in the concrete.

SUPPORT FOR PIER CAP FORMWORK

The EFCO ADJUST-A-DECK frame, used with E-BEAM joists and contractor supplied plywood, acted as a work platform and supported the formwork for various pier caps. The **ADJUST-A-DECK**® frame was supported by column mounted EFCO Support Brackets.

The EFCO E-Z DECK system was selected for the rigid frame support 50'-1 1/2" (15.276 m) wide x 249'-3" (75.960 m) long x 18'-8 1/2" (5.7 m) high. EFCO's E-Z DECK system is designed to dramatically reduce labor costs and shorten construction cycle times. Modular units were assembled on the ground and lifted into place. The shore framing components are aluminum with the advantage of hollow tube fast thread plated steel screw jacks. Each shoring leg has a capacity up to 28 kips (124.5 kN) and can be spaced anywhere from 4' x 4' (1220 mm x 1220 mm) to 10' x 10' (3050 mm x 3050 mm) and rectangular modules in between. Using all the standard components, the E-Z DECK system has amazing versatility. ◊

E-Z DECK TOWER COMPONENTS

EFCO's E-Z SHORE® has a capacity from 16 to 28 kips (71 kN to 124.5 kN) per leg with a 2.5:1 safety factor.

PROJECT LOCATION

Between Mississauga and Milton, Canada

EFCO EQUIPMENT

PLATE GIRDER®, ADJUST-A-DECK® Frame, E-Z DECK®

WEST CORRIDOR CONSTRUCTORS TEAM

Tony Thoms ..... Sr. Superintendent
Hugh O'Donnell..... Sr. Superintendent
Terry Davidson .....Superintendent
Eric Perreault .....Superintendent
Vanel Ngansoo..... Project Coordinator
Camilo Serrano.....Project coordinator

EFCO FORMWORK SPECIALISTS–GEORGETOWN

Derek Downey.....Sr. Territory Manager
Richard Wilder..... Field Supervisor
Shah Khan ..... Engineer

New Construction at Andrews Air Force Base

The ability to cycle and reconfigure the PLATE GIRDER® panels for each structure saved on freight costs and reduced the amount of material stored on a tight jobsite.

TRAFFIC CONTINUES DURING BRIDGE CONSTRUCTION

The Suitland Parkway is a roadway that services commuters in and out of Washington D.C. into Prince George's County and services Andrews Air Force Base. It has been overly congested for over a decade. The project's scope was to replace the I-495 bridge over Suitland Parkway and to replace and reconfigure the on and off ramps at Andrews Air Force Base.

BRIDGE CONSTRUCTION METHODS

Before constructing a bridge, there are many factors to consider when selecting formwork and construction methods. **Milani Construction** teamed with EFCO and devised a plan that would reduce traffic delays, closures and construction time. It was decided to replace the I-495 bridge in four phases.

Milani Construction was awarded the contract as General Contractor and is self-performing the concrete work for this cast-in-place bridge. EFCO's value-added expertise and the knowledge of EFCO's sales, engineering and field service teams made the decision easy.

NO PLYWOOD NEEDED

EFCO's ***PLATE GIRDER***® and **REDI-RADIUS**® formwork performed consistently pour after pour and eliminated the need for foam or wood jobsite built arches. This saved time during cycling of the formwork panels and provided a smooth finish. The ability to cycle and reconfigure the *PLATE GIRDER* panels for each structure saved Milani Construction on freight costs and reduced the amount of material stored on a small jobsite. ◊

PROJECT LOCATION

Washington D.C.

EFCO EQUIPMENT

PLATE GIRDER, REDI-RADIUS

MILANI CONSTRUCTION TEAM

Silvania Mendez.....Senior Project Manager

EFCO FORMWORK SPECIALISTS–WASHINGTON D.C.

Andrew Brown.....Territory Manager
Rick Lynch.....Field Supervisor
David Thibeau .....Engineer

HOW TO CONNECT

https://www.milaniconstruction.net/

FORMWORK FOR A CONCRETE BEAM AND SLAB BRIDGE DECK

PARTS OF A CONCRETE SPAN BRIDGE

The White Oak Bridge project was designed as a concrete span bridge pier and pier caps resting upon multi-stem bents. EFCO engineers are masters of creating formwork solutions for these horizontal structures that transfer deck loads to the piers, and then to the foundation. Once the bridge caps were placed, the bridge spans were designed as cast-in-place beam and slab decking.

REDUCING COST OF FORMWORK IN CONSTRUCTION

To form this bridge deck, EFCO engineers designed and utilized a combination of ***PLATE GIRDER®***, **SUPER STUDS®**, **E-BEAMS®**, ledger beams and support brackets. The EFCO design also incorporated customer owned EFCO equipment and reduced the cost of formwork in construction.

REPEAT FORMWORK USE – REDUCES COSTS

Manhattan Road & Bridge Company, the contractor for this project, has constructed several similar bridges utilizing this method. Speed and skill come with repetition, which increases productivity and helps get the job done faster, saving money. Past experience with EFCO's formwork design, along with EFCO's easy-to-use formwork, helped Manhattan Road & Bridge Company maintain their production schedules, increasing their profit.

EFCO SERVICES – WHY TRUST ANYONE ELSE?

EFCO project planning, engineering and on-site training services help keep costs under control while planning the formwork system. EFCO services will help determine the most efficient formwork design along with a cost-effective formwork solution, providing the lowest in-place concrete cost. ◊

PROJECT LOCATION

Cabot, Arkansas

EFCO EQUIPMENT

PLATE GIRDER, E-BEAM and SUPER STUD

MANHATTAN ROAD & BRIDGE TEAM

Brandon Keszeg.....Project Manager
Willie Fort.....Superintendent

EFCO FORMWORK SPECIALISTS–MEMPHIS

Brandon Spence .....Territory Manager
Mark McCarty .....Sr. Field Supervisor
Weston Means ..... Engineer

HOW TO CONNECT

https://manhattanconstructiongroup.com/manhattan-road-bridge/

> ***Using EFCO's PLATE GIRDER® system and field service has really helped me learn more about bridge work, making me better at managing my crew and being better at my job while transitioning to bridges. EFCO's erection drawings are easy to read. I like the fact that EFCO's warehouse is so close and how EFCO's Field Service and Territory Manager are always available to help throughout our projects. I especially appreciate how quickly they respond, react, and fix any unforeseen obstacles that tend to come up with construction projects.***
>
> ***Brandon Keszeg***
> ***Project Manager***

The all-steel, fixture built precision panels have been designed to be interchangeable with a common bolting pattern, allowing the PLATE GIRDER Forming System to adapt easily to changing wall and beam configurations.

This feature also provides excellent panel joint alignment, eliminating offsets and minimizing grout leakage.

Forming America's Infrastructure

THE GILCREASE EXPRESSWAY

Tulsa, Oklahoma in 2019 awarded the construction of the Gilcrease Expressway to Gilcrease Constructors. This $230M expressway helps bypass downtown Tulsa on the west side and contains numerous overpass bridges for railroad tracks and the Arkansas River. This infrastructure project is expected to fuel economic growth and is going to be achieved with a commitment to safety, productivity and teamwork.

The project required several of Oklahoma's best contractors and EFCO worked with a number of them. They included: **Oklahoma Bridge Company (OBC), Central Bridge Company (CBC) and Becco Contractors, Inc**.

> ***After looking at EFCO's system compared to other systems, it was absolutely clear that EFCO provided the best savings for our needs. I am an EFCO customer going forward and look forward to doing business with EFCO on all our projects***
>
> ***Gary Quinonez***
> ***Central Bridges, Owner***

TEAMWORK IN FORMWORK CONSTRUCTION

The expressway was managed through Gilcrease Constructors, and several bridges were awarded to different contractors as the project went along. EFCO's optimization of methods and scheduling of construction through teamwork in formwork utilization and on-site support, enabled EFCO to ensure the best engineering, quality of execution and timely construction of this project.

EFFICIENT INFRASTRUCTURE FORMWORK CONSTRUCTION

Being that it is such a large infrastructure construction project and started just a few months after the beginning of the 2020 pandemic, extensive planning was essential. The experts at EFCO moved

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EFCO provided the cost-effective, well-engineered hinged-bottom PLATE GIRDER® pier cap formwork.

the project along swiftly, efficiently and economically. EFCO provided the cost-effective, well-engineered hinged-bottom ***PLATE GIRDER***® pier cap formwork. Several bridges had identical caps which enabled the contractors to cycle within a few hours and be on to their next pour.

CENTRAL BRIDGE

Central Bridge Co. (CBC) was the first contractor to work with EFCO on the Gilcrease Expressway. Using EFCO's *PLATE GIRDER* hinged soffit formwork along with flared columns, Central Bridge was able to complete work ahead of schedule and take on more work on the Project than originally expected. Because the expressway was managed through the Gilcrease Constructors, several bridges were awarded as the project went along. Every time a new bridge was awarded, EFCO was right there to fill Central Bridge's needs. EFCO's labor saving formwork created more value and more revenue for Central Bridge.

OKLAHOMA BRIDGE COMPANY

Oklahoma Bridge Company (OBC) had not worked with EFCO prior to the Gilcrease Expressway Project. After several meetings with OBC's leadership, they agreed to let EFCO supply formwork for two bridges. The construction of these two bridges were such a success that they used EFCO formwork to construct several more bridges on this project.

Once again, EFCO's cycle time and labor-saving capabilities were realized and EFCO gained a new customer.

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EFCO's fast cycle time and labor saving capabilities made Oklahoma Bridge Company a repeat customer.

BECCO CONTRACTORS

Becco Contractors has been a great customer for EFCO over the last several years. With Becco securing contracts for the River Bridges of the Gilcrease Expressway, EFCO was able to supply a quick cycle solution for rapid cycling. Becco purchased and rented **Round Columns**® and ***PLATE GIRDER***® forms. They also used the new 70 Kip (311 kN) Support Bracket. This new bracket allows customers to only use a single bolt which helps eliminate alignment issues typically seen with a two bolt bracket.

PROVIDING THE LOWEST IN-PLACE CONCRETE COST

EFCO, CBC, OBC and Becco Contractors, Inc. worked closely together to reduce forms needed, increase productivity, and provide the lowest in-place concrete cost for this project.

PROJECT LOCATION

Tulsa, Oklahoma

EFCO EQUIPMENT

PLATE GIRDER

BECCO CONTRACTORS TEAM

Aaron Wilcox.....Project Manager
Mike Townson .....General Superintendent

CENTRAL BRIDGE TEAM

Gary Quinonez .....Owner, Project Manager

OKLAHOMA BRIDGE CO. TEAM

Reed Wood .....General Superintendent
Mark Willy.....President

EFCO FORMWORK SPECIALISTS–DALLAS

Steven Schaad .....Territory Manager
Dave Whipple .....Field Supervisor
Kate McComb ..... Engineer

HOW TO CONNECT

https://www.beccousa.com/Default.asp

EFCO's new 70 Kip (311 kN) Support Bracket, which only requires a single bolt, was used by Becco Contractors. It helped eliminate alignment issues typically seen with a two bolt bracket.

Pedestrian Bridge Makes Way to Old Downtown Gilbert Easier

PEDESTRIAN BRIDGE CONSTRUCTION OVER UPRR

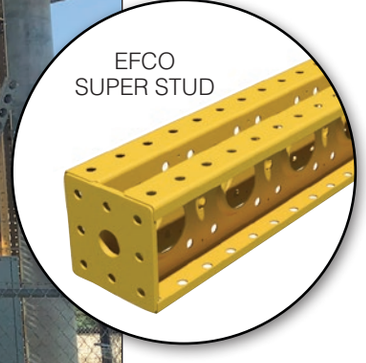
Construction of the Neely St. Pedestrian Bridge was performed to provide access from neighboring houses over the Union Pacific Railroad Mainline to the newly revamped old downtown Gilbert. With a total length of 858' (262 m), the pedestrian bridge was broken down into three segments. The approach from the West consisted of nine spans that are 35' (10.7 m) long, the center segment was a steel truss bridge and the approach from the East consisted of 10 spans with an average length of 35' (10.7 m).

FORMWORK FOR THE CONCRETE PIER COLUMNS

CS Construction got to work quickly on the pier columns; 3' (900 mm) diameter round columns sitting on either spread footings or drilled shafts by utilizing EFCO **Round Column®** formwork. The Round Column formwork system features vertical flange connections on 2-ft. (600 mm) centers. These enable cycling the forms from set-up to set-up in half the time. Once progress had been made and the abutments had been formed and poured, construction of the expansion caps followed shortly after.

BRIDGE CAP SHORING

The bridge caps were shored up using EFCO aluminum **E-Z DECK®** shore towers, providing a simplified dancefloor for a safe and accessible work deck to form and pour the caps. Because of the compatibility and versatility of EFCO products, EFCO engineers are capable of configuring complex bridge caps.



Needing to work around existing pump equipment, SUPER STUD shore posts were utilized for greater leg loads and as runner beams, providing greater spans between the shore posts.

BULLNOSE COLUMN CONSTRUCTION ON SPANNING BRIDGE

At the end of each approach, large 9'-6" x 4' (2.9 m x 1.2 m) bullnose columns were needed to support the steel truss bridge spanning over the live rail line. EFCO ***PLATE GIRDER®*** and Round Column® forms combined to provide a stable and dimensionally sound form setup to shape the bullnose columns. A common bolting pattern on EFCO formwork enabled this combination of forms to work together.

SHORING THE CAST-IN-PLACE SLAB DECK

With the vertical support structures complete, next was the cast-in-place slab deck portion of the bridge.

SAFE SHORING SOLUTION - SHORING DECKS BUILT ON GROUND

Looking for a safe shoring solution with productive labor rates, EFCO engineers began to design a repeating shore table pattern that could be used in the typical bays on both approach sides. Furthering this productivity, the shoring decks were designed to be built completely on the ground and flown into place atop the preset shoring tables. With the typical spans designed, the non-typical end spans were the final step. Needing to work around existing pump equipment, **SUPER STUD®** shore posts were utilized for greater leg loads and as runner beams, providing greater spans between the shore posts.

PROJECT LOCATION

Gilbert, Arizona

EFCO EQUIPMENT

Round Column, E-Z DECK®, *PLATE GIRDER and* SUPER STUD

CS CONSTRUCTION TEAM

Garrett Cross .....General Superintendent
Todd Wells .....Superintendent
Zachary Lambert .....Project Manager

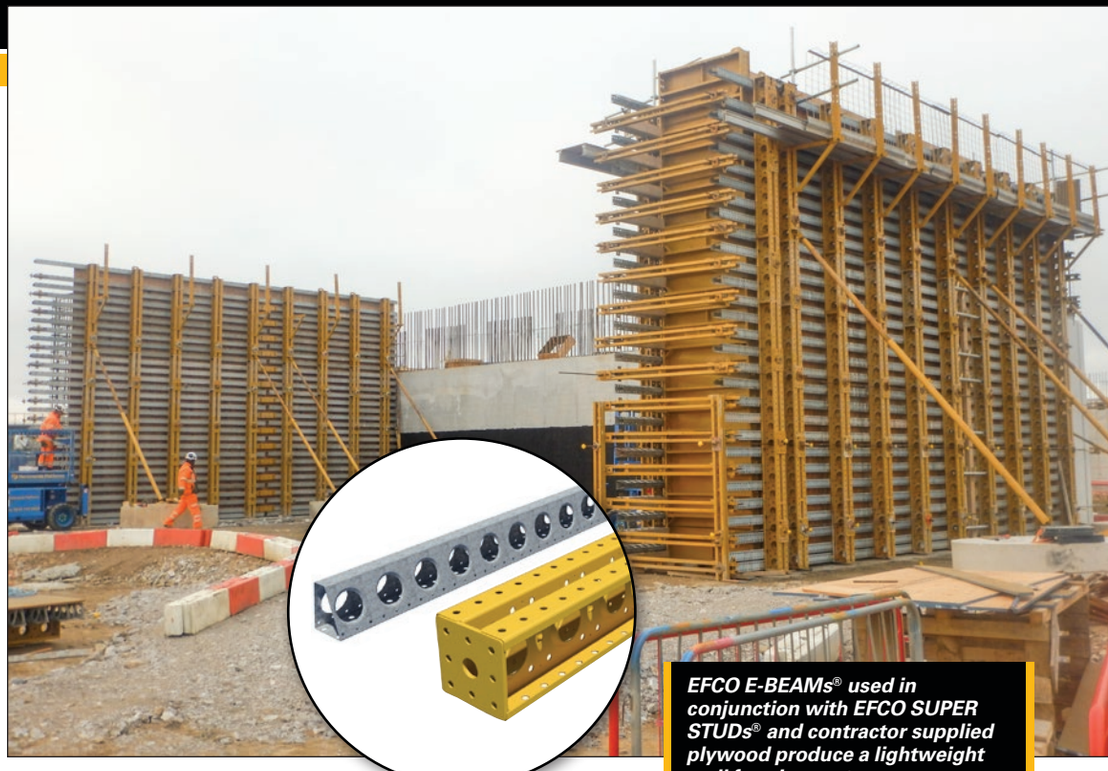
EFCO FORMWORK SPECIALISTS–PHOENIX

Bill Salus.....Sr. Territory Manager
Thomas Hill..... Engineer

HOW TO CONNECT

https://csconstruction.com/

New Road to Help Stimulate Local Growth



EFCO E-BEAMs® used in conjunction with EFCO SUPER STUDs® and contractor supplied plywood produce a lightweight wall forming system.

E-BEAM AND SUPER STUD

ROAD AND BRIDGE CONSTRUCTION CREW

EFCO UK are nearing completion on another major road infrastructure project. EFCO UK has been working with **Barrett Civil Engineering** and main contractor, Costain Group, on the Preston Western Distributor Road. It will link Preston and Southern Fylde to the M55 motorway and will be opening on schedule at the start of 2023.

CONCRETE FORMING SOLUTION

This US$276.6 million (£200 million), 12-mile- (19.3-km-) long dual carriageway involved the construction of a new motorway junction, four new bridges and three underpasses. EFCO UK have provided a combination of ***PLATE GIRDER®***, **SUPER STUD®** and **E-BEAM®**, and **E-Z DECK®** to form and prop concrete bases, pile caps, piers, abutments, wingwalls and parapet beams on the Savick Viaduct, Bartle Lane Bridge, Beaconshall Bridge and the River Lea crossing.

INFRASTRUCTURE CONSTRUCTION CREATES NEW JOBS AND HOMES

This project forms the cornerstone of the new Preston City Deal, an initiative that aims to create 20,000 new jobs and 17,000 new homes, as well as new schools, health provisions and green spaces to cater to the growing population in the area.

PROJECT LOCATION

Between Preston and M55, United Kingdom

EFCO EQUIPMENT

PLATE GIRDER, E-Z DECK, E-BEAM and SUPER STUD,

BARRETT CIVIL ENGINEERING TEAM

Craig Millns.....Operations Director
Eamon Barrett.....Project Manager
Paul Strong .....Superintendent

EFCO FORMWORK SPECIALISTS–UNITED KINGDOM

Gerry Brown .....Sr. Territory Manager
Colin Walker.....Sr. Field Supervisor
James Wood ..... Engineer

HOW TO CONNECT

https://www.barrettgroupuk.co.uk/barrett-civil-engineering-ltd

An average PLATE GIRDER® panel weighs 18 lb/ft² (0.86 kN/m²) and with stands up to 1400 lb/ft² (67 kPa) pour pressure.

Knox Dam Restoration Project to Meet Safety Regulations

DAM RESTORATION AND SAFETY REGULATIONS

In the Spring of 2020, **Beaver Excavating** of Canton, Ohio was awarded the Knox Lake Dam restoration project in Fredericktown, Ohio. This Ohio Department of Natural Resources (ODNR) project, which was originally built in 1954, was to undergo a renovation to bring it into compliance with current ODNR Dam safety regulations.

CONSTRUCTION OF ONE-SIDED CONCRETE WALLS

Beaver Excavating leased the EFCO **E-BEAM**® and **SUPER STUD**® forming system to form the one-sided walls with pours ranging from 22'-6" (6.9 m) to 26'-6" (8.1 m) long and up to 32'-2" (9.8 m) tall for the dam restoration project. Beaver Excavating chose EFCO because they wanted a form system that would be strong enough to withstand the pour pressures associated with the construction of the tall, one-sided concrete walls and use a minimal amount of ties as they were drilling and epoxying ties into the existing walls.

FORMWORK SOLUTION TO FORM THE CONCRETE OGEE WALL

Beaver Excavating also looked to EFCO to design and lease 1,102 ft² (102.4 m²) of the EFCO **REDI-RADIUS**® form system to be used with a SUPER STUD frame system to form the upper and lower sections of the concrete ogee wall. EFCO's flexible REDI-RADIUS formwork was ideal in forming the double continuous S-shaped ogee.

FORMWORK SAFE PRACTICE SOLUTION

The flexible all-steel REDI-RADIUS® formwork system was shaped into the desired curvature of the ogee and attached to the SUPER STUD® frame. This ogee formwork solution was designed with formwork safe practices in mind, it was built up on the ground and then picked by a crane as an entire assembly and set into place. The system was then anchored to the existing concrete structure. One set of equipment was leased for the four lower ogee wall pours, and a second set of equipment was leased for the four upper ogee wall pours. ◊

PROJECT LOCATION

Fredericktown, Ohio

EFCO EQUIPMENT

REDI-RADIUS, E-BEAM and SUPER STUD

BEAVER EXCAVATING TEAM

Jeff Engelhart ..... Project Superintendent
Brooks Stengel.....Senior Project Manager

EFCO FORMWORK SPECIALISTS–COLUMBUS

Eddie George .....Sr. Territory Manager
Brian Jenne .....Field Supervisor
Daniel Burns ..... Engineer

HOW TO CONNECT

https://www.beaverexcavating.com/

The flexible all-steel REDI-RADIUS formwork system was shaped into the desired curvature of the ogee and attached to the SUPER STUD frame. The system was then anchored to the existing concrete structure.

Concrete Dam Gets Face Lift

CONSTRUCTION OF LARGEST CONCRETE DAM IN DELAWARE

Edgar M. Hoopes Dam is the largest concrete dam in the state of Delaware at 135' (41.1 m) high, 845' (257.6 m) long and a maximum capacity of 11,000 acre-feet (13.6 million m^3), a normal capacity of 6,300 acre-feet (7.8 million m^3). It is owned by and supplies water to the City of Wilmington. It was built in 1932 and has been restructured multiple times.

MULTIPLE REPAIRS TO THE DAM OVER THE YEARS

Allan Myers, Inc. has done multiple repairs to the dam over the years, the most recent includes refacing the concrete structure and repairing the crest. Allan Myers used their own ***PLATE GIRDER***® forms and accessories purchased from EFCO, as well as leased equipment from EFCO to reface the dam.

SELF-SPANNING SELF-SUPPORTING FORMWORK SYSTEM

The EFCO *PLATE GIRDER* panel is a complete forming unit which does not require external walers or stiffbacks. This system eliminates many parts and accessories and, most importantly, reduces construction labor required to build, set, and strip this formwork system. The *PLATE GIRDER*® panels can be bolted together with EFCO's Quick Bolt to provide a self-spanning, self-supporting structural form. The structure face pours consisted of 56 LF (17.1 m) x 8' (2.4 m) tall *PLATE GIRDER* gangs. The dam crest typical pours were 60 LF (18.3 m) x 12' (3.6 m) tall. The structure face is at a 27-degree angle.

PROJECT LOCATION
Wilmington, Delaware

EFCO EQUIPMENT
PLATE GIRDER®

ALLAN MYERS, INC. TEAM
Dan Paternak.....Superintendent

EFCO FORMWORK SPECIALISTS–MARLBORO
Pat Beam.....Territory Manager
Dan Astarita.....Field Supervisor
Jacquelyn Ewald, PE..... Engineer

HOW TO CONNECT
https://www.allanmyers.com/

EFCO PLATE GIRDER panels can be bolted together with EFCO Quick Bolts to provide a self-spanning, self-supporting structural form that does not need stiffbacks.

Meeting Formwork Standards in Mine Construction

REQUIREMENTS FOR CAST-IN-PLACE CONCRETE FORMWORK STANDARDS

The Quebrada Blanca mine is in the Tarapacá Region of northern Chile at an altitude of 14,500' (4,400 m), 150 miles (240 km) southeast of Iquique and 930 miles (1,500 km) from Santiago. Quebrada Blanca is an open pit operation that leaches ores to produce copper cathodes at a solvent extraction and electrowinning (SX-EW) plant. The copper cathode is then trucked to the port of Iquique for distribution. Part of the expansion project of this mine, called Phase 2, corresponds to the construction of the Dry Area that was awarded to **Echeverría Izquierdo Montajes Industriales S.A.** As a long-time EFCO customer, they knew of EFCO's formwork standards, quality of equipment, engineering expertise and experience in forming and shoring projects so they chose EFCO once again.

CONCRETE WALL FORM SYSTEMS

Echeverría Izquierdo was in need of concrete wall form systems for a Primary Crusher and a Tunnel. They contracted with EFCO to complete the construction of both structures.

DOUBLE-SIDED CONCRETE WALL FORMWORK SYSTEM

The Primary Crusher has a total height of 112' (34 m) and five levels. EFCO designed the double-sided concrete walls to be formed with the ***PLATE GIRDER***® system. The double-sided walls are mostly 20' (6 m) and 23' (7 m) high and, with the versatility of the *PLATE GIRDER* panels, were assembled into gangs and cycled efficiently.

SAFE, FAST SHORING SOLUTION

EFCO's **E-Z DECK**® shoring system combined with **SUPER STUD**®, **Z-BEAM**® and **E-BEAM**® decks were used to shore the floor slabs of the Primary Crusher. Due to its high-capacity load, the E-Z DECK system is ideal for this type of application, where the slab thickness varies from 2'-4" (700 mm) to 5'-7" (1700 mm).

MODULAR TUNNEL FORMWORK

The Recovery Tunnel consisted of two 230' (70 m) long tunnels with 23' (7 m) high walls and a 6'-7" (2000 mm) thick roof slab. EFCO's innovative design used *PLATE GIRDER* panels to form the double-sided walls. This formwork is efficient on all foundation types and is easily moved and cycled in large gangs. The pour windows in the *PLATE GIRDER* panels were very useful in placing concrete in tall walls with dense rebar. Pour windows are also good for inspecting or vibrating concrete during pours.

SHORING THE SLAB ROOF

EFCO's aluminum frame shoring system, E-Z DECK, with its high-load capacity of 20 kip (89 kN) per post, efficiently handled the slab shoring needed for the roof slab of the Recovery Tunnel. For lease or sale, the E-Z DECK shoring system is designed to reduce labor and shorten construction cycle times. ◊

The steel ribs of the PLATE GIRDER system form panels serve not only as web stiffeners but also as beams to transfer the horizontal pressures of the liquid concrete from the form face plate to the form panel top and bottom flanges.

PROJECT LOCATION

Pica, Región de Tarapacá, Chile

EFCO EQUIPMENT

PLATE GIRDER®

ECHEVERRÍA IZQUIERDO MONTAJES INDUSTRIALES TEAM

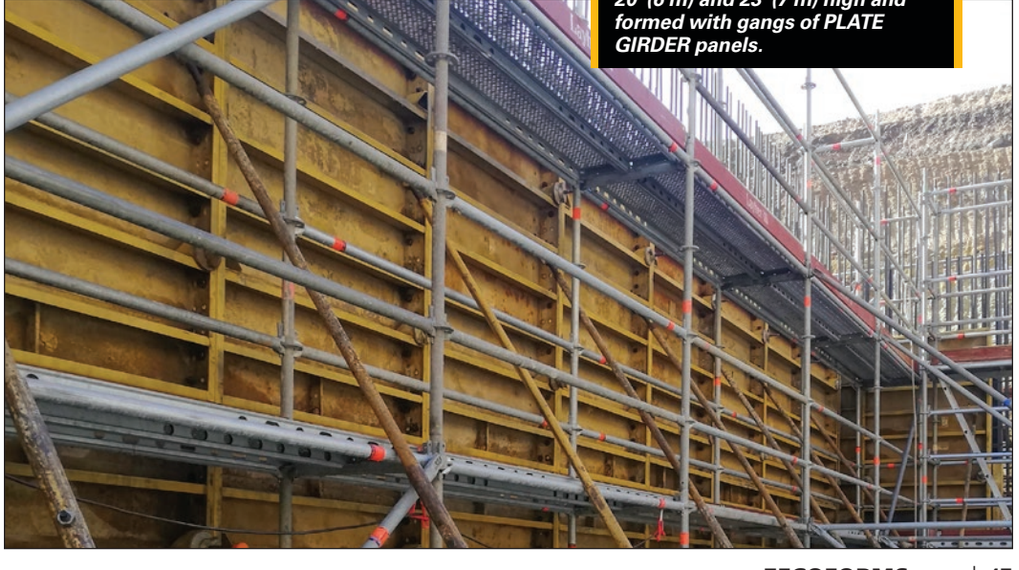
Cristian Vergara.....Project Manager
Eduardo Cienfuegos.....Job Administrator
Carlos Aldana.....Job Chief
Patricio Aedo.....Area Chief

EFCO FORMWORK SPECIALISTS–CHILE

Claudio Sánchez.....Sr. Territory Manager
Sergio Malschafsky.....Field Supervisor
Conrado Llanza.....Engineer

HOW TO CONNECT

https://ei.cl/en/



The double-sided walls in the Primary Crusher are mostly 20' (6 m) and 23' (7 m) high and formed with gangs of PLATE GIRDER panels.

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Assisting in International Rural Development

SwapLoader hook lift hoist plays a role in numerous industries and applications, and this includes involvement in community relations and support. The mining company, Anamina, has operations in the district of San Marcos north of Lima, Peru. In this district the company mines copper and zinc. As part of its sustainable development program, the company works with local communities to make lasting improvements in their infrastructure and daily community life.

Anamina purchased a SwapLoader SL-412 from SwapLoader distributor, Corporation Teval, last year and then donated it along with a HINO 1726 truck to the community of La Comunidad Campesina de Santa Cruz de Pichiu. In concert with the truck and SwapLoader hoist, Anamina donated a water tank to allow the community to deliver safe drinking water throughout the population; a flatbed for transport of materials needed for community infrastructure construction; a waste container and a dump box for gravel and sand delivery in road and drainage improvements.

The community is taking advantage of the one truck and SwapLoader hoist to complete many different operations, from available potable water, street repair and construction, to support for the community's main business--agriculture. The area is well known for its seed potato production providing 170 varieties to the rest of Peru. Improvements in the local market roads is imperative to further development.

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