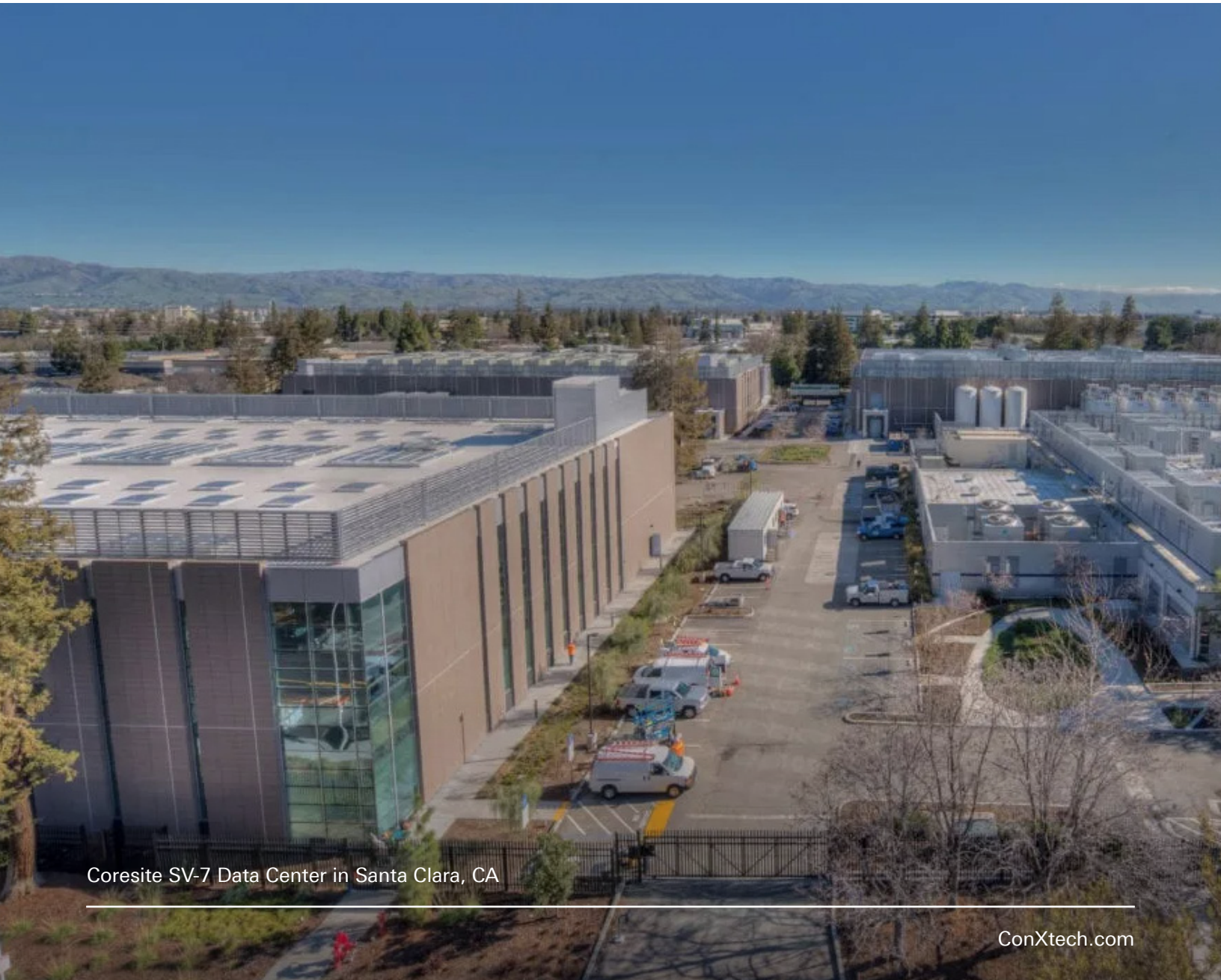
CONXTECH®
SIMPLY FASTER

MISSION CRITICAL | DATA CENTERS

HOW CONXTECH FRAMING CAN PROVIDE AN EFFECTIVE, ROBUST SOLUTION FOR HEIGHTENED MISSION CRITICAL FACILITY DEMAND.

Engineering for Speed in the Data Center Marketplace

ENGINEERING FOR SPEED PART OF A TECHNOLOGY SERIES ON COMPREHENSIVE STRUCTURAL ENGINEERING SOLUTIONS



Coresite SV-7 Data Center in Santa Clara, CA

Contents

Introduction

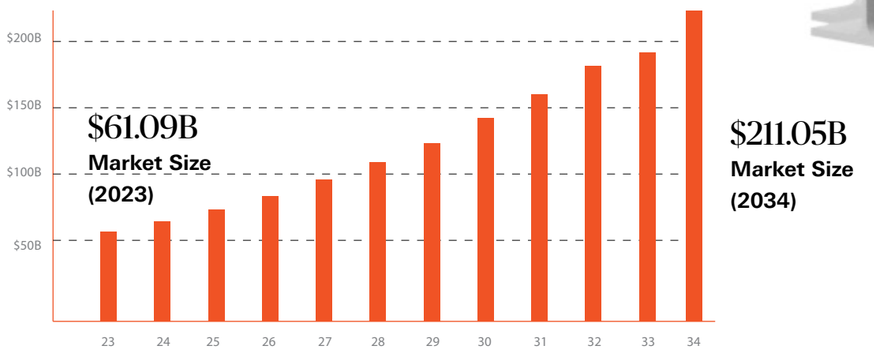
The relentless march of Artificial Intelligence (AI) is pushing the data center industry to its limits. AI's ever-increasing complexity and processing demands are creating a ravenous hunger for data storage and computational power. Traditional construction methods, with their lengthy timelines, simply can't keep up with this insatiable appetite.

The consequences of sluggish data center construction are far-reaching. Companies eager to leverage AI's potential are forced to wait for the infrastructure to catch up. This delay translates into lost opportunities, stunted growth, and a competitive disadvantage in the ever-evolving marketplace.

North America, a hub for technological innovation, is at the forefront of this data center boom. The region boasts a mature and well-established data center market, with major hubs concentrated in Virginia, Silicon Valley, Dallas, and New York. These locations offer advantages like reliable power grids, robust fiber optic networks, and access to skilled labor.

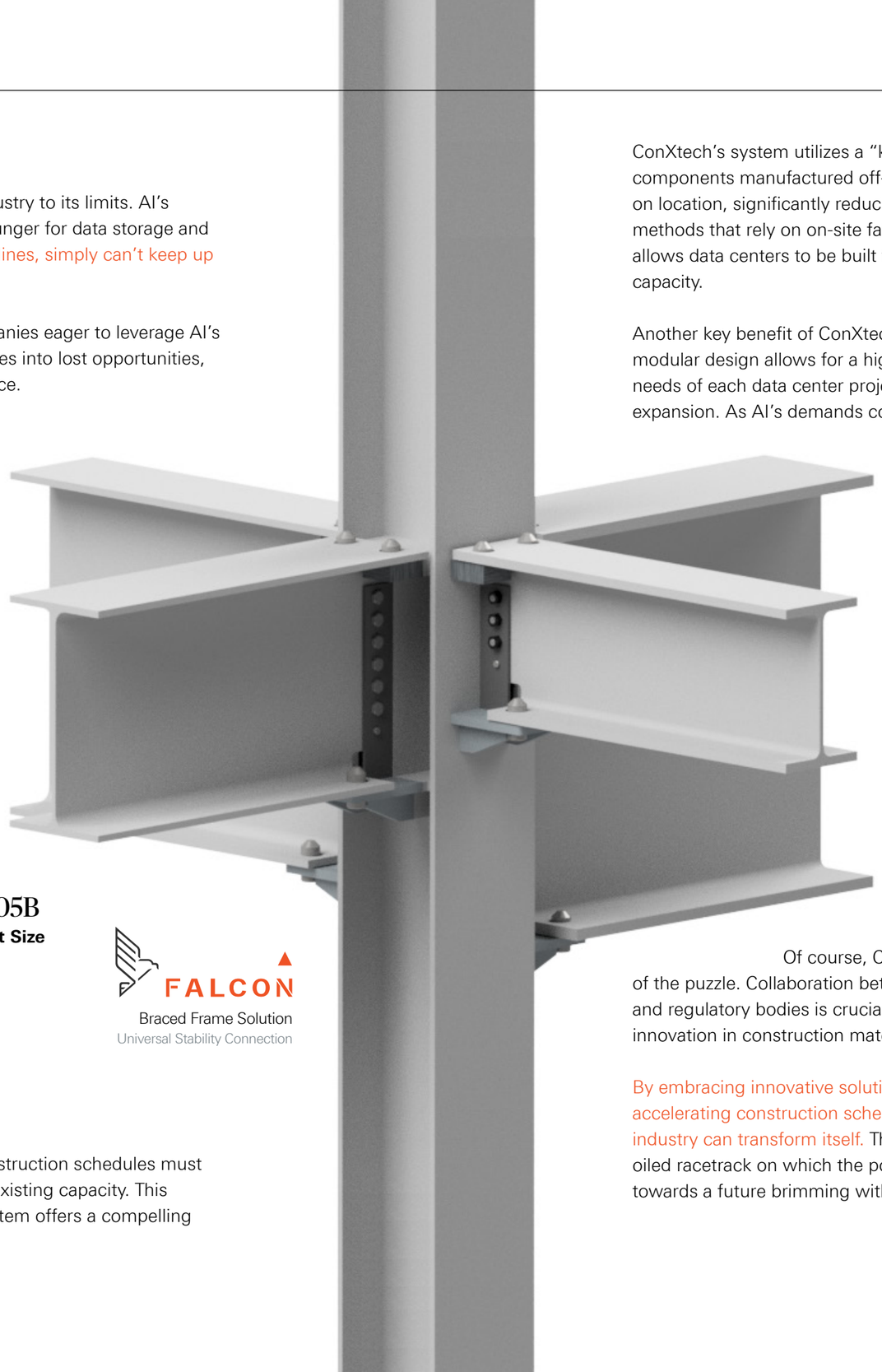
Looking towards the future, the growth trajectory of US data centers is nothing short of phenomenal. Industry analysts predict a staggering rise in demand, with market size expected to reach a staggering $211 billion by 2034. This growth will be driven by factors like continued cloud adoption, the proliferation of 5G networks, and the increasing sophistication of AI applications.

U.S. Data Center Market Size 2023 to 2034



Source: www.precedenceresearch.com/data-center-market

To address this challenge, the data center industry needs a paradigm shift. Construction schedules must be drastically accelerated to bridge the widening gap between AI's needs and existing capacity. This necessitates a new approach, and ConXtech's prefabricated structural steel system offers a compelling solution.



ConXtech's system utilizes a "kit of parts" approach, with pre-engineered steel components manufactured off-site. These components can be quickly assembled on location, significantly reducing construction time compared to traditional methods that rely on on-site fabrication and welding. This streamlined process allows data centers to be built faster, meeting the urgent need for increased capacity.

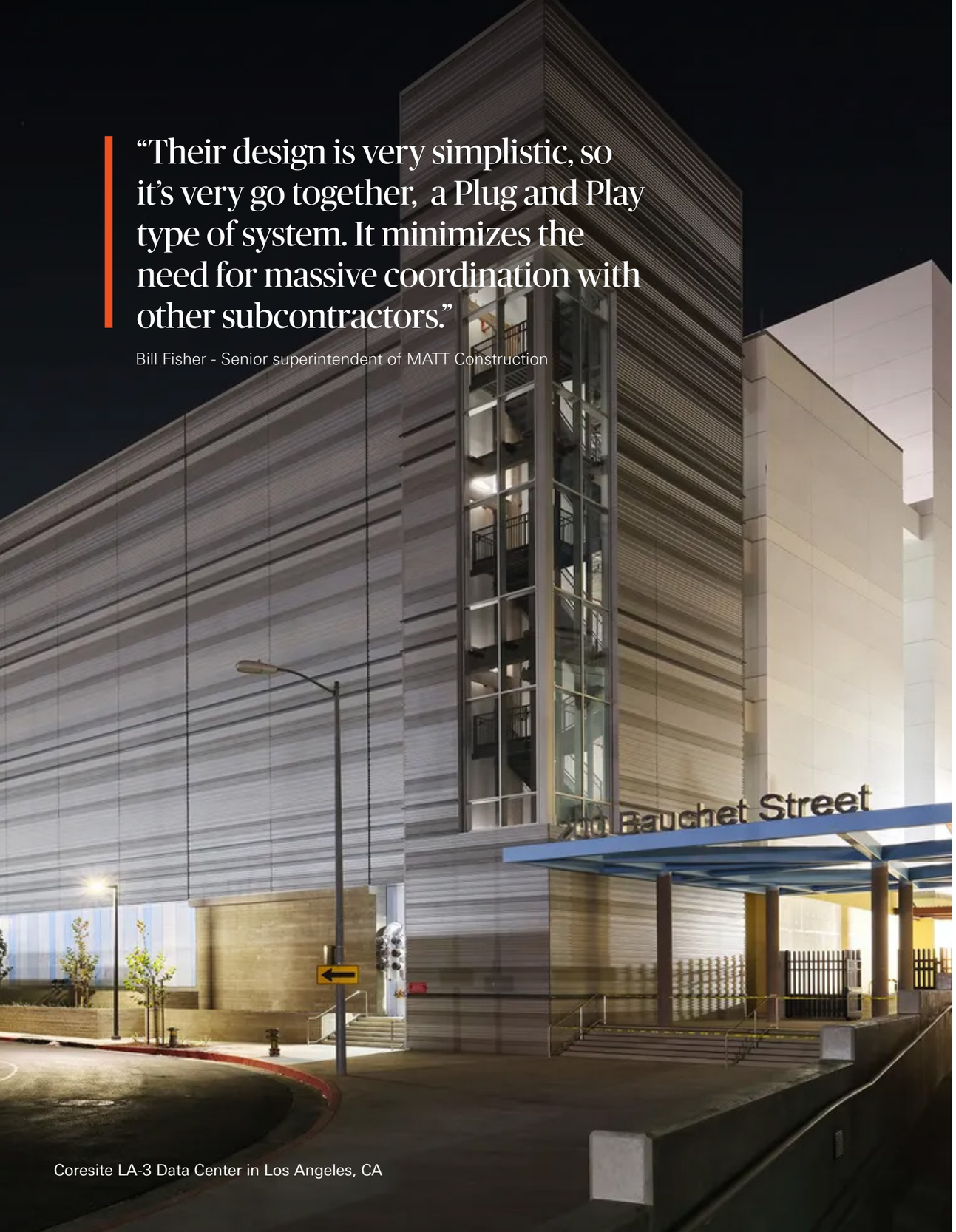
Another key benefit of ConXtech's system lies in its inherent flexibility. The modular design allows for a high degree of customization, catering to the specific needs of each data center project. Additionally, the modularity facilitates future expansion. As AI's demands continue to grow, data centers can easily expand their capacity by adding additional prefabricated modules.

The benefits extend beyond speed and flexibility. ConXtech's steel construction offers superior strength and durability compared to traditional concrete structures. This translates into a more robust data center environment, better equipped to handle the heavy equipment and demanding thermal requirements associated with advanced AI applications.

Furthermore, ConXtech's system promotes sustainability in construction. Prefabrication minimizes on-site waste and reduces the environmental impact of the building process. This aligns perfectly with the growing focus on eco-friendly solutions within the data center industry.

Of course, ConXtech's prefabricated system is just one piece of the puzzle. Collaboration between technology companies, construction firms, and regulatory bodies is crucial. Streamlining permitting processes and fostering innovation in construction materials and techniques are essential steps.

By embracing innovative solutions like ConXtech's prefabricated steel system, accelerating construction schedules, and fostering collaboration, the data center industry can transform itself. This transformation will ensure it remains the well-oiled racetrack on which the powerful engine of AI can continue to propel us towards a future brimming with technological advancements.



> “Their design is very simplistic, so it’s very go together, a Plug and Play type of system. It minimizes the need for massive coordination with other subcontractors.”
>
> Bill Fisher - Senior superintendent of MATT Construction

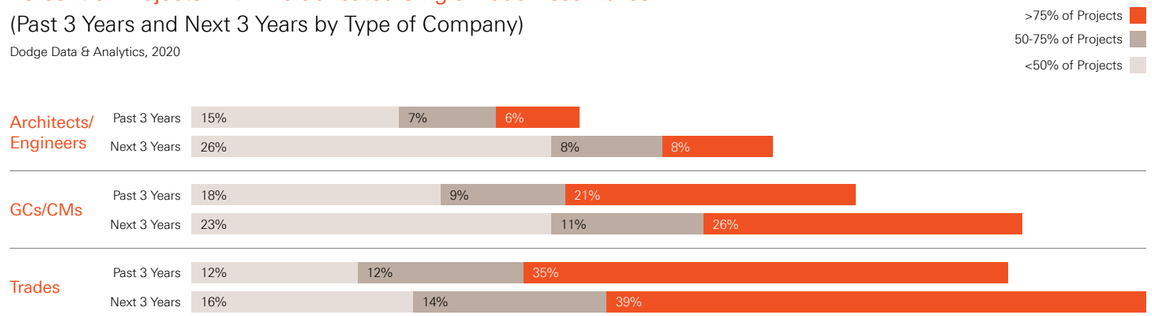
Coresite LA-3 Data Center in Los Angeles, CA

ConXtech: A Unique Solution in the Structural Engineer’s Tool-belt

Percent of Projects with Prefabricated Single Trade Assemblies

(Past 3 Years and Next 3 Years by Type of Company)

Dodge Data & Analytics, 2020



Prefabricated and modular methods of construction are not new, but their use is surging across the global construction sector. Global markets have experienced a significant uptick in demand for everything from pre-manufactured assemblies to volumetric modular apartments built offsite. Real estate developers are driving much of the sector’s growth, hoping to achieve faster construction schedules that produce earlier revenue and lower overall carrying costs. In their 2019 report, Modular construction: From projects to products, McKinsey researchers brought wide attention to the positive impacts of offsite construction manufacturing – finding that certain forms have a consistent track record of accelerating project timelines by 20% to 50%.

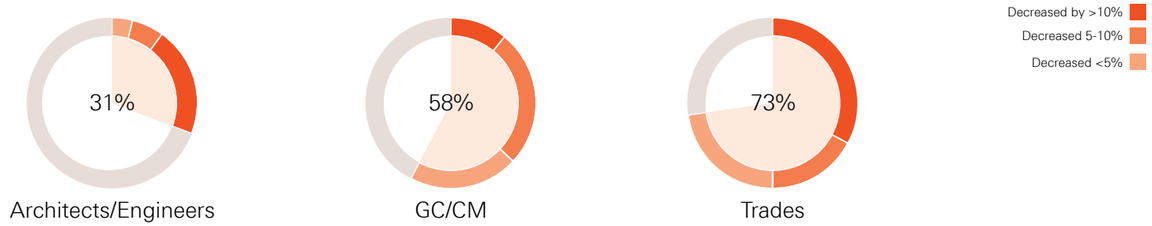
Offsite constructed systems range from prefabricated roof trusses to fully-finished, factory-built housing units, and the use of such systems is on the rise. In a report published by Dodge Data & Analytics, Prefabrication and Modular Construction 2020, 31% of engineers and architects, and 58% of general contractors reported that using some form of prefabrication meaningfully improved overall project timelines. Almost 70% of architects and general contractors in the Dodge study anticipated specifying single-trade prefabrication over the next 3 years.

In addition to project schedule acceleration, moving complex building assemblies into a controlled factory environment promotes improved safety, sustainability, and quality metrics.

Impact of Prefabrication on Project Schedule Performance

(Percentages Reporting Each of Three Levels of Improvement)

Dodge Data & Analytics, 2020



ConXtech's Prefabricated Structural Systems

Imagine a Meccano® kit or Erector Set® that's sized for real buildings. In 2004, ConXtech founders imagined this very thing - and the result was a patented system for steel erection that has been accelerating projects and delighting general contractors ever since. ConXtech's effectiveness and success are due to the elegance and simplicity of its system. Each steel member is engineered and precisely fabricated, and ConXtech's patented moment collars and gravity connections are attached at the factory – making it easy for ConXtech crews to slot members easily together on-site without field welding. In many cases an entire building structure can be assembled by a crew 1/3 the size of a traditional steel erection crew.

The system is simple by design, making it easy to specify, price, and install. The kit of parts includes the company's signature moment frame collars, plus a wider variety of connections and assembly details suitable to address a broad spectrum of building requirements.

This white paper will provide a basic understanding of the ConXtech system that will be specifically useful for engineers and architects, along with helpful tips for owners and general contractors – along with some guidelines on best project application and practices for using the system on your projects. First - a brief introduction to the spectrum of components that ConXtech has developed for rapid connection at the jobsite:

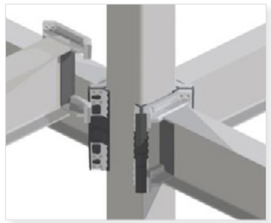
"The first time I saw a Conxtech structure go up, we all high fived each other because we had never seen anything like that before."

Marvin Wheat - Vice President, Northern California W.E. O'Neil Construction

Our Original Special and Intermediate Steel Moment Frames

ConXtech Moment Frame Beams & Columns

For 20 years, Conxtech has been at the forefront of steel frame connections, revolutionizing the construction industry. Our journey began with the ConXR 200 System, laying the groundwork for efficient and reliable connections. Building upon this success, the ConXL 300 and 400 Systems were introduced with innovative features that transformed the way structures are assembled. These three basic system offerings under ConXtech's patented moment frame system address different building types and sizes. Each system features a standard tube steel or boxed column with prefabricated collars, with a range of beam profile sizes (spans) available within that system type.



CONXL™ 400

The CONXL400 is the most robust and widely used system, and is well suited for healthcare, MOB, commercial and institutional sectors. The wider bay sizes offer the most flexibility for office spaces that change over time. This system features 16" HSS or boxed columns and bay sizes can range from 18' – 45'.

CONXR™200

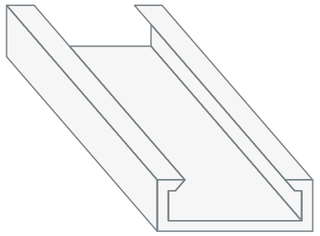
The CONXR200 is well suited for high density residential, hospitality, senior and student housing projects because of its lighter structure, and smaller column sizes. The system features 8" HSS tubed steel columns and bay sizes can range from 8' - 24'.

CONXL™ 300

The CONXL300 is well suited for process industry pipe racks, manufacturing, and certain office environments. The system features 12" HSS or boxed columns and bay sizes can range from 12' - 30'.

All ConXtech steel members, connection collars and flanges are precision-manufactured to order and quality inspected in the shop environment to ensure tight tolerance and perfect fit-up in the field. The patented features of the collars and the specialty fixturing used in the shop neutralize quality issues and imperfections of rolled steel, allowing for guaranteed fit-up every time, with beam-setting speeds under 10 seconds per piece. Crews guide the beams into position above the joint and let the specialty connector plates fit the member into a fully secured and aligned position under the influence of gravity, using hands-free Lower and Lock™ technology built into the connectors. Crews are able to perform all of the main steel erection from the safety of elevated work platforms, as opposed to a traditional method, where workers are required to climb upon beams and columns to align and bolt (or weld) connections using hand tools.

The ConXtech erection method, facilitated by "lower and lock" connections, enables crews to erect a single bay to full height (8 stories or the maximum working height of the elevated work platform, whichever is less) before erecting adjacent structural bays.



Conventional Connections and Steel

While the drivers of acceleration on a ConXtech building are its special ConXtech connections, the system is entirely versatile, and ConXtech collars might be paired with more traditional steel elements such as brace frames and moment frames where more appropriate on a given project. During the Schematic Design phase, the ConXtech engineering team can help to reduce or eliminate the number of field-welded conditions to optimize for erection speed during construction.

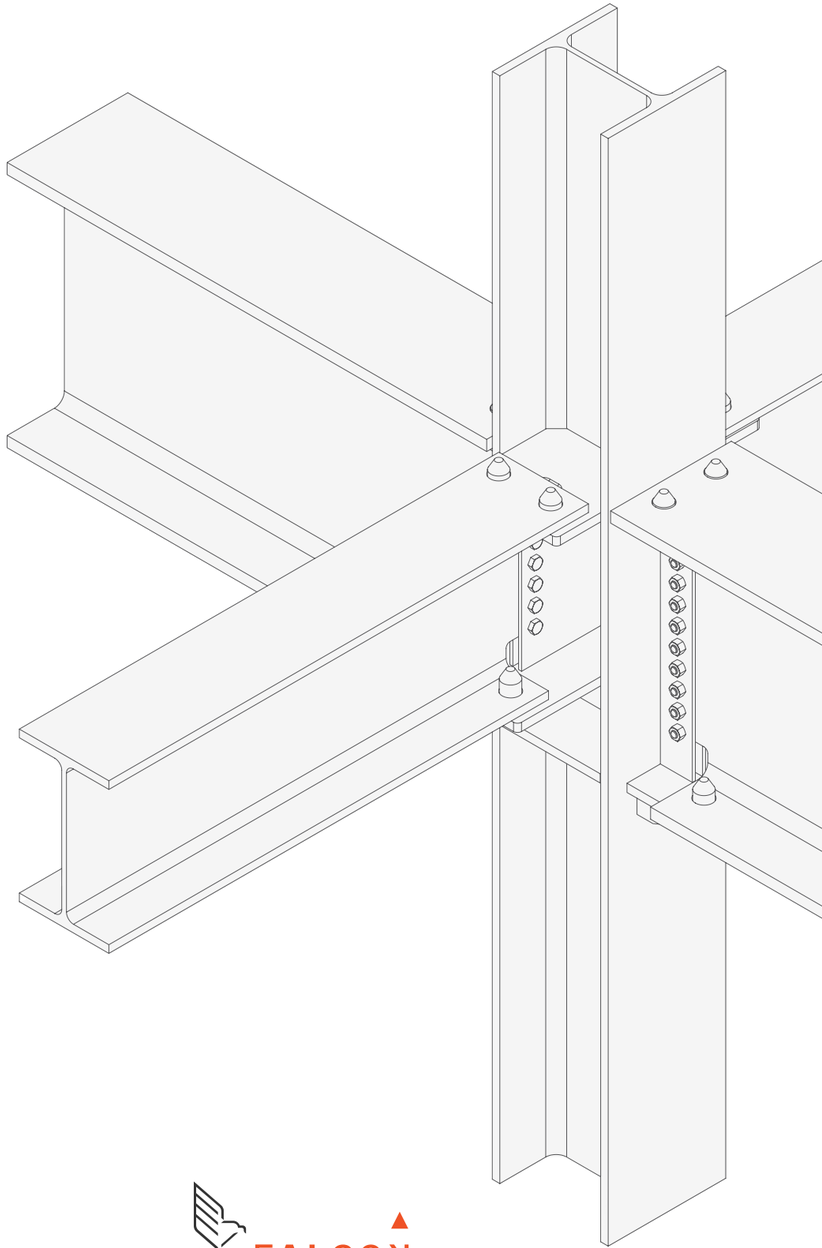
> "When we teamed up with Conxtech again, we knew that they would be exponentially quicker in the process then with typical steel. "

Bill Fisher - Senior superintendent of MATT Construction

Braced Frame Solutions

We're excited to unveil our latest breakthrough that gives us access to the entire US Structural Framing Market: **Falcon**. Drawing on decades of experience and cutting-edge technology, this new multipurpose gravity connection redefines structural integrity, efficiency and speed. These patented lower + locking gravity connections facilitate steel erection 3-5x faster than traditional forms of steel erection. On a project greater than 100,000 square feet, this can mean weeks or months of schedule savings.

The FALCON gravity solutions for brace frame design are well suited for Mission Critical, Life Sciences, Advanced Manufacturing, Healthcare, K-12 / Higher Education.



FALCON
Braced Frame Solution
Universal Stability Connection

Falcon Is FASST

Flexible

Least disruptive to the owner's design team and adopts the SEOR's design outright. Works with any LFRS and can be incorporated at any design stage. Can be used with wide flange or HSS columns.

Affordable

Uses conventional steel components that are readily available at any mill or service yard. Domestic or international supply chains can be utilized to offer the most cost-effective execution strategy.

Scalable

Allows for a competitive bidding pool. Any qualified fabricator or erector can build a Falcon design, making every fabricator and erector a partner and not a competitor to ConXtech.

Sustainable

Allows ConXtech the greatest chance of delivering an offering that is truly within range of the conventional steel market from a sustainability standpoint.

Time-Saving

The principle of "Lower and Lock" technology now brings speed of erection and unprecedented safety to the construction market for any steel design.

Falcon Advantage

Overview

ConXtech's original products were designed to provide a better solution for special moment frame buildings. Recent product developments have enabled ConXtech to service braced frame building as well, effectively increasing U.S. target market by ten times to address all types of steel framing.

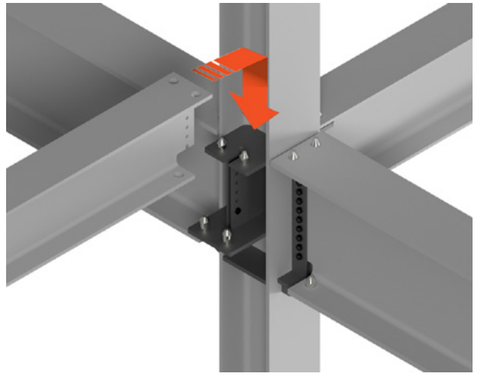
$22.4B
US Steel Framing Industry (2023)

10%
Special Moment Frame

Frame design required for certain buildings in seismically active areas. ConXtech's bi-axial moment frame solution is perfect for this market given system attributes and cost versus competing solutions.

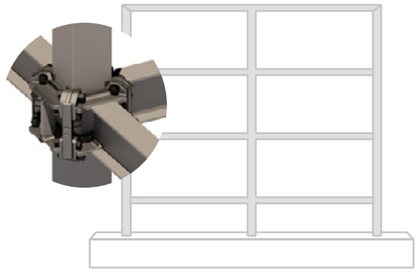
90%
Braced Frame

ConXtech has now developed **Falcon**, a lower + locking brace frame solution that accelerates project schedules to dominate traditional steel systems (patent pending).

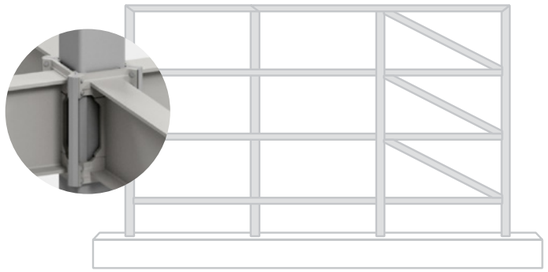


FALCON
Braced Frame Solution
Universal Stability Connection

Steel Framing System Comparison



Moment Frame
- Open floor plan
- No sheer walls or bracing
- Moment frame acts as lateral system



Braced Frame
- Lateral force system supported by braces
- Larger spans and member sizes
- Typical in non-seismic markets

Case Study ROI: Data Center

Coresite SV-7 Data Center

PROJECT NARRATIVE

This 230,000 ft² data center in Santa Clara, CA was erected in just 15 days. The structure is part of CoreSite's 618,000 ft² campus at Coronado Drive and Stender Way.

CONX SOLUTIONS

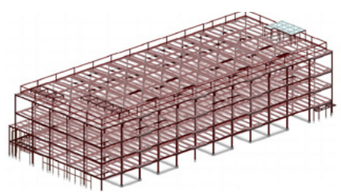
The ConXL System addressed CoreSite's need for a robust, long-span steel data center frame deliveredcost-effectively and with increased speed to market. Although the ConXL System was utilized in the main frame of the structure, the ConXR System was also used on the roof to support cooling towers and for framing the canopy located in the building's lobby. The structure also features a louver support frame using our elevator guide rail and roof screen details. The 90-foot columns were fabricated, shipped and erected at full-height which is both more time and cost effective. ConXL's inherent lack of shear walls and bracing allow for a fully open and reconfigurable floor plan which provides ultimate flexibility for mechanical system routing and future upgrades.

PROJECT DATA

Square Footage	230,000 ft²
Steel Assembly Duration	15 Days
Number of Collars	260
Bay Spacing	30'-4" x 31"
Structure Weight	2,046 tons; 17 lbs./ft²

STAKEHOLDERS

Owner	CoreSite
Architect	DCM
Engineer	FBA Engineers
Contractor	MATT Construction
Steel Fabricator	ConXtech Manufacturing
Steel Erector	ConXtech Construction
ConXtech Scope	Structural Steel, Stairs, Metal Decking



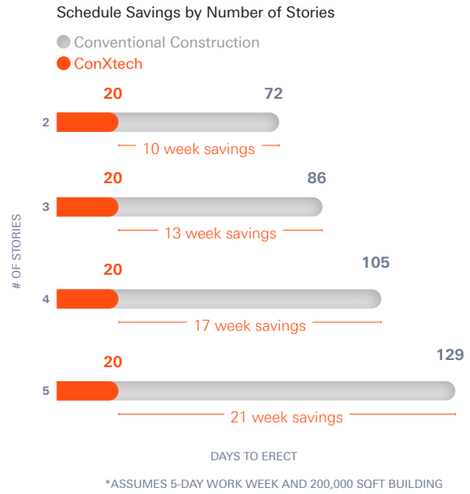
Simply Faster: By the Numbers

Coresite SV-7 Data Center

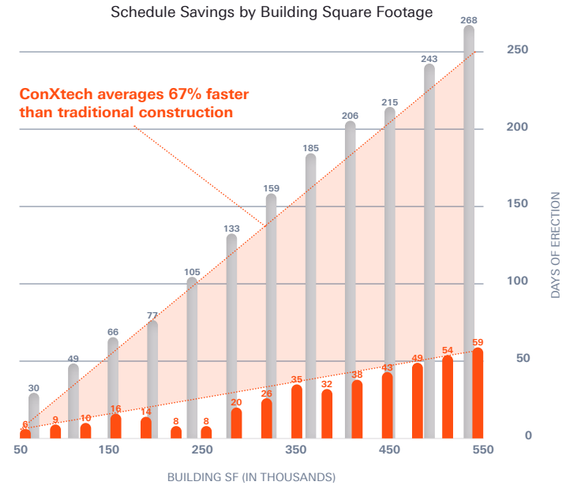
Brass tacks time…how much faster is a ConXtech implementation than traditional steel erection methods? ConXtech analyzed project data from the last 15 years of erecting the system, and then compared that data with that of average steel erection speeds on similar projects erected in a more traditional fashion. By comparison, on most projects steel erection using ConXtech was 3-5x faster than a comparative steel erection using traditional means, with the greatest differentiation on buildings of greater than two-stories. The charts below offer some insight into the magnitude of savings and the relative impact of increasing building stories vs. square footage. On the left, the ConXtech savings as stories are added to the building, with square footage held constant. On the right, the inverse - the building remains a constant four stories, and square footage is increased.

Savings vs. Conventional Construction:

- Magnitude of savings is proportionate to magnitude of project
- On average, Conxtech is 67% faster



*ASSUMES 5-DAY WORK WEEK AND 200,000 SQFT BUILDING

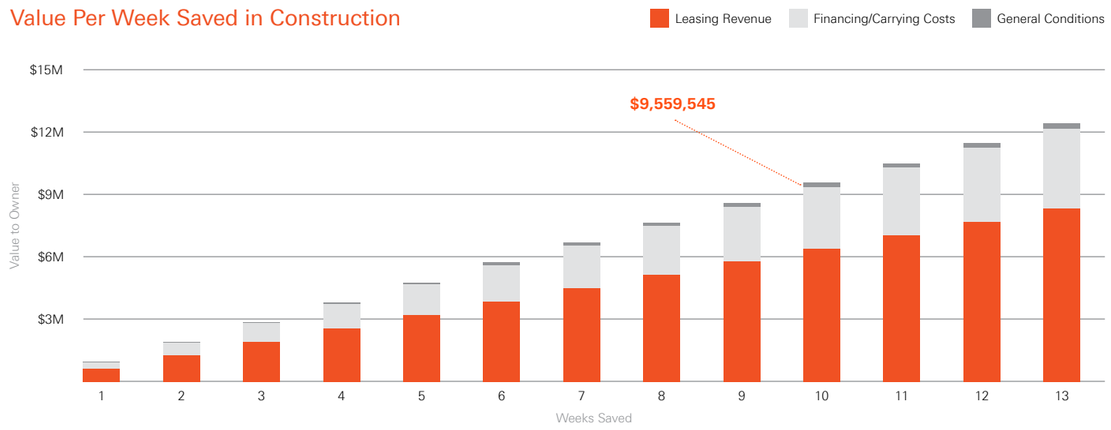


*ASSUMES 5-DAY WORK WEEK AND 4-STORY BUILDING

The data indicates that in either case - the higher or the larger the project - the greater the comparative schedule savings versus a traditional steel erection process. The comparative benefit is most prominent, however (by about 30% per story), as the building increases story-to-story, given the unique process advantage of the ConXtech system.

The economic impact of these schedule savings is substantial. On a recently constructed data center project, one client analyzed the economic benefit of using ConXtech on his project.

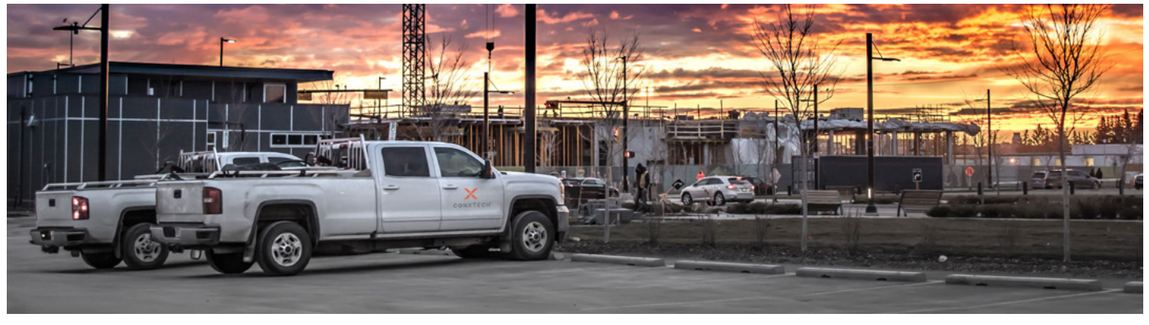
Time is Money:



The general contractor suggested that somewhere between 10-12 weeks were saved using the ConXtech system, and the above chart illustrates the value of those weeks in the eyes of the owner (Note these numbers have not been escalated to reflect today's value). Succinctly,

	$6,415,191	(Value of Early Revenue)
	$2,948,049	(Project Financing Costs saved at the end of the project)
+	$196,305	(Contractor General Conditions Saved)
	$9,559,545	**Total value of 10 weeks saved (in 2016 dollar values)**

Economic benefits will depend on the dynamics of each project, primarily driven by the scale of the project, financing costs, and projected revenue.



LEAN from Off-site Manufacturing to On-site Erection. ConXtech Process Improvements over the Years.

ConXtech's patented connections are designed to make life easy for its crews on-site, and constant feedback over fifteen years has made both factory and field teams better over time. Here are a few of the specific tactical benefits the system has achieved over time:

The Lower and Lock™ connections don't require on-site welding, and the connections are designed to facilitate a meaningfully improved construction process in the field that helps general contractors move other trades into the building sooner.

Steel inspections are dramatically reduced on-site.

All ConXtech connections are "lower and lock" which provides instant stability, even prior to bolting. Because the structure can be stabilized during construction by the collars before bolting, crews can reduce interior cable bracing during erection of the primary frame.

A ConXtech prefabricated framing system is installed by workers standing on a fully planked elevated working surface while fully tied off and surrounded by a full-height safety rail. Unlike with a traditional steel erection method, using the ConXtech "lower and lock" details workers can set beams without exiting the safety of the railed work platform. The platform moves with the worker, eliminating the 30' climbing height limit that restricts conventional steel erection. By avoiding the typical limitations, crews can erect the building to full height from bay to bay, safer and far faster than a comparable steel structure.

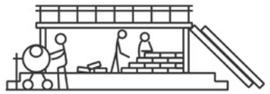
> "It was like clockwork. The team would show up with just the amount of Steel that they were going to erect that day. They were erected pretty much within a week and a half to two weeks a four story building was completely erected."

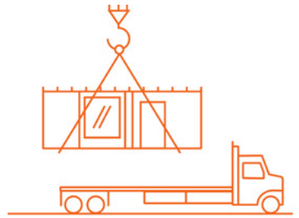
Jay DiMaggio - Data Center & Real Estate Development Consultant

Factory & Jobsite Integration

Benefits

- Increased Labor Productivity
- Less Waste
- Highly Skilled Workforce
- Improved Jobsite Efficiency
- Quality Control
- Advanced Technology





Labor Productivity Increases by 30% on Offsite Projects

Source: McGraw Hill

End-to-end LEAN process, from manufacturing through erection.

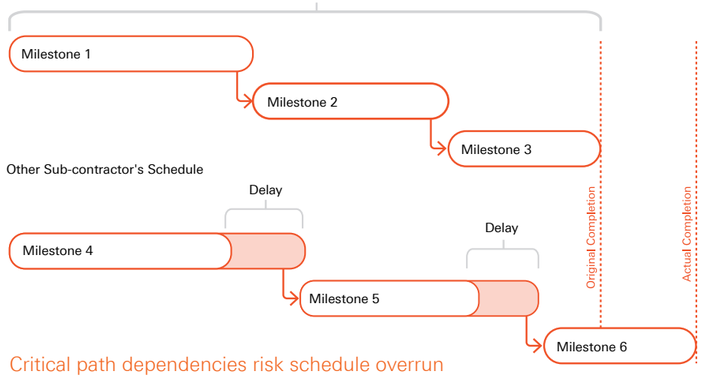
Shifting labor from the jobsite to the factory.

Extending factory precision to the jobsite.

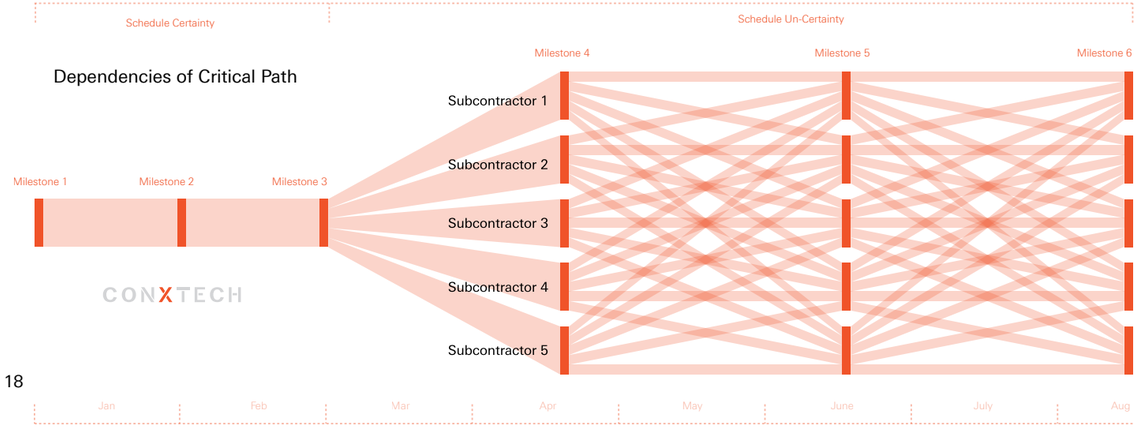
.

Critical Path Impact

- ConXtech impacts critical path directly
- We are the only subcontractor that can reliably claim schedule savings
- Following the completion of ConXtech's scope, multiple subcontractors begin working simultaneously effecting each others' critical path

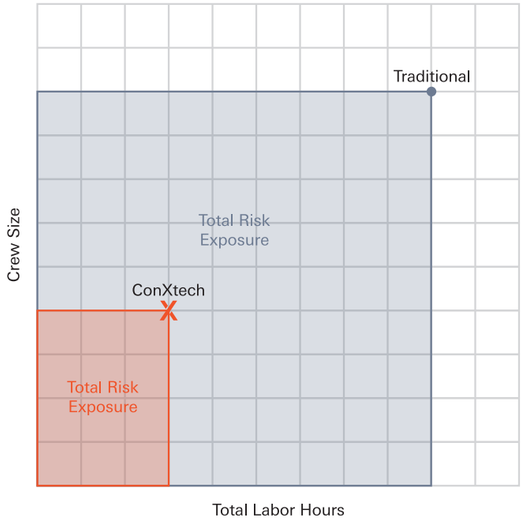


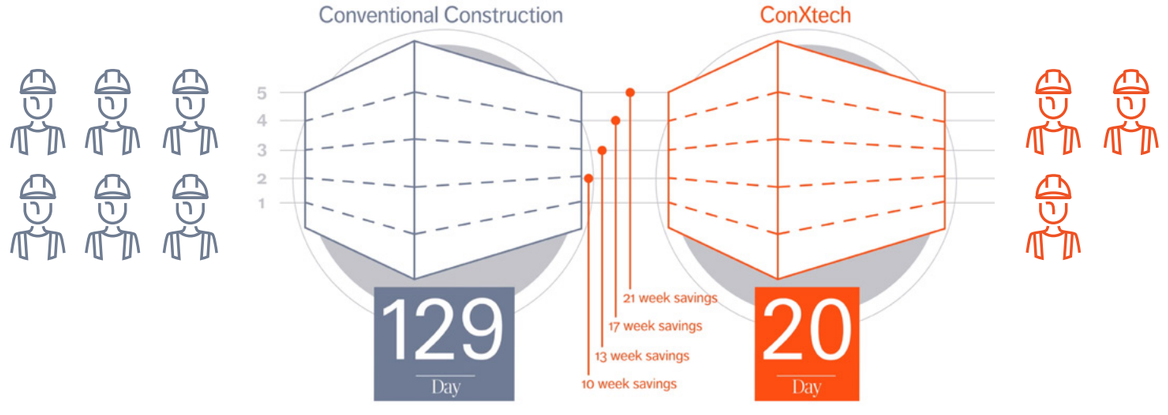
Critical path dependencies risk schedule overrun



Safer Steel Erection Sequencing

- Crew works out of baskets, not walking the steel
- Beams drop into place less than 6 secs
- Smaller crew size + less labor hours = Less exposure to risk
- Less craft labor on the jobsite for a shorter duration leads to better safety outcomes





About 1/2 the crew size and 1/2 the labor hours

Industry leading interstate EMR

ConXtech's riggers and connectors work from the safety of high reach mobile work platforms operating in delineated fall hazard exclusion areas, enabling them to quickly and safely move from work point to work point.

0.76
INTERSTATE
EMR

CONXTECH®

Cultivating HVRs

ConXtech has multi-year working relationships with the end-use Clients / Owners and Design Engineers & General Contractors based on its proven track record; this shared success is the basis for significant repeat business.

Kit of Parts

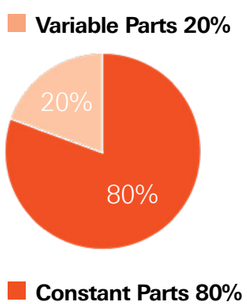
Due to the repeatability of the system, our standard kit of parts offer consistency throughout yet allow for site specific customization of the lateral force resisting system as required.

Kit of Parts

80%-90% =constant
10%-20% =variable

Prototype Variable Part List:

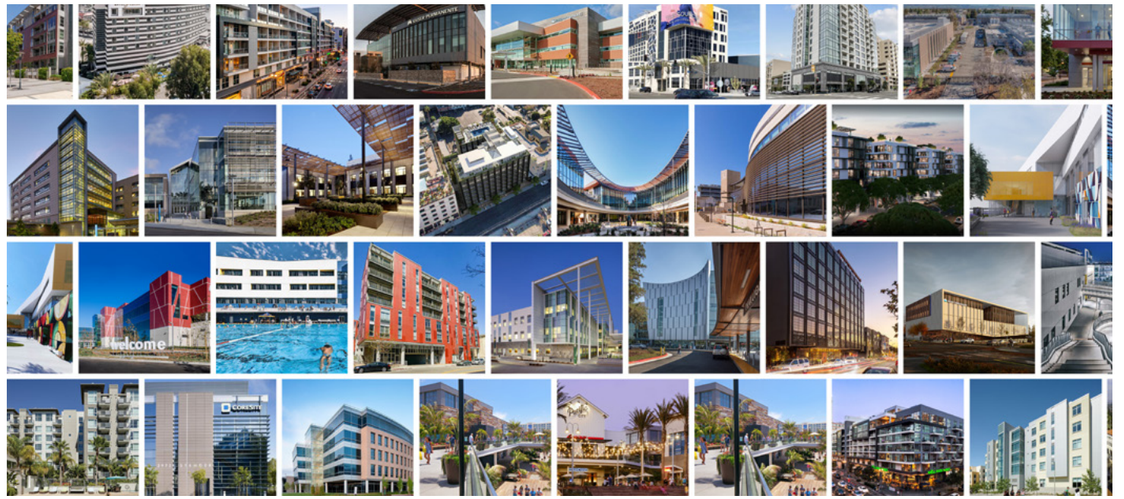
- Seismic Lateral Bracing/System
- Non-Seismic Lateral Bracing



Prototype Constant Part List:

- Gravity framing & connections
- Moment Connections
- Decking
- Base Plates
- Anchor Rods
- Clips, angles and other small parts
- Galvanized roof dunnage
- Galvanized roof screens
- Egress Stairs
- Elevator support steel

Unlimited Design and Engineering Possibilities



Streamline method of erection Built-up is Built-in

Traditional

Multiple people per joint in precarious positions

Conxtech

Work out of man-basket, only one person needed at joint to easily lower and lock into place (not even one man…only one hand)

Billboard/X-tree Installation speeds assembly time

Traditional

Tiered Erection – mired in redundancy

Conxtech

Billboarding – instant stability +fewer “at risk” hours onsite

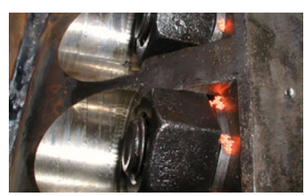
No lost time to inspections, testing and reworking

Traditional

Field weld testing/inspection leading to re-work

Conxtech

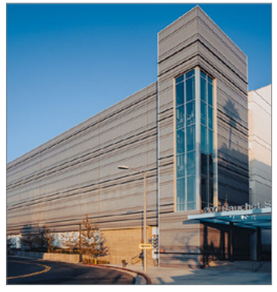
ConX simplifies inspection

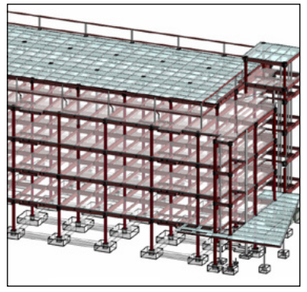


Coresite LA-3 Data Center

PROJECT NARRATIVE

The Coresite LA3 project is a 4 story Data Center with a rooftop mechanical platform. This 180,000+ Sq.Ft. data center building offers a robust, long-span steel data center frame devoid of shear walls and bracing which provides for a fully open floor plan for interior buildouts. This building will serve our clients' needs for data storage solutions to keep up with the ever-changing technology business requirements.





PROJECT DATA

Square Footage	180,000 ft²
Steel Assembly Duration	28 Days
Number of Collars	279
Bay Spacing	30'-0"
Structure Weight	1,750 tons

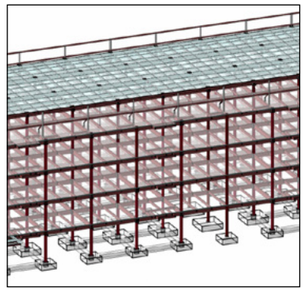
STAKEHOLDERS

Owner	CoreSite
Architect	DCM
Engineer	John A.Martin & Associates (JAM)
Contractor	DPR Construction
Steel Fabricator	ConXtech/ /Thai Herrick
Steel Erector	ConXtech Construction
ConXtech Scope	Structural Steel, Mechanical Platform, Stairs & Elevator

Coresite SV-4 Data Center

PROJECT NARRATIVE

The ConXL System frame for this 100,000 ft² data center in Santa Clara, CA was erected in 9 working days. The building was designed to LEED Gold standards, featuring energy efficiency initiatives such as 97% efficient UPS units, variable frequency drive (VFD) cooling units, and air-side economization. The data center is part of CoreSite's 618,000 ft² campus at Coronado Drive and Stender Way.



PROJECT DATA

Square Footage	100,000 ft²
Steel Assembly Duration	9 Days
Number of Collars	64
Bay Spacing	28'-4" x 36"
Structure Weight	622 tons; 13 lbs./ft²

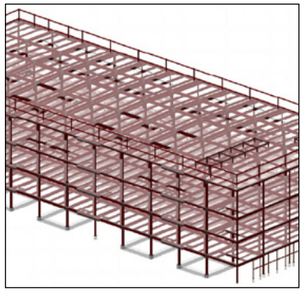
STAKEHOLDERS

Owner	CoreSite
Architect	DCM
Engineer	FBA Engineers
Contractor	MATT Construction
Steel Fabricator	ConXtech Manufacturing
Steel Erector	ConXtech Construction
ConXtech Scope	Structural Steel, Stairs, Metal Decking, Misc. Metals

Coresite SV-5 Data Center

PROJECT NARRATIVE

This 101,250 ft² data center in Santa Clara, CA was erected in just 9 days. The structure is part of CoreSite's 618,000 ft² campus at Coronado Drive and Stender Way. ConXL's inherent lack of shear walls and bracing allow for a fully open and reconfigurable floor plan which provides ultimate flexibility for mechanical system routing and future upgrades.



PROJECT DATA

Square Footage	101,250 ft²
Steel Assembly Duration	9 Days
Number of Collars	88
Bay Spacing	30'-4" x 31"
Structure Weight	793 tons; 16 lbs./ft²

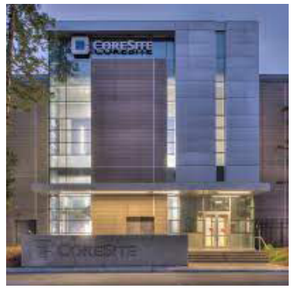
STAKEHOLDERS

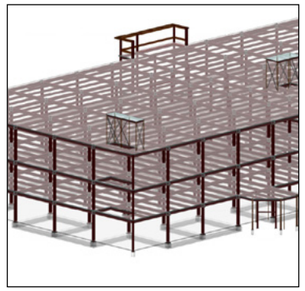
Owner	CoreSite
Architect	DCM
Engineer	FBA Engineers
Contractor	Hathaway Dinwiddie
Steel Fabricator	ConXtech Manufacturing
Steel Erector	ConXtech Construction
ConXtech Scope	Structural Steel, Stairs, Metal Decking, Misc. Metals

Coresite SV-6 Data Center

PROJECT NARRATIVE

This 136,000 ft² data center in Santa Clara, CA was erected in just 9 days. The structure is part of CoreSite's 618,000 ft² campus at Coronado Drive and Stender Way. The ConXL System also delivered a solution for the highly concentrated floor loadings (275 psf) required with unparalleled structural efficiency.





PROJECT DATA

Square Footage	136,000 ft²
Steel Assembly Duration	9 Days
Number of Collars	164
Bay Spacing	30'-4" x 31"
Structure Weight	1,275 tons; 19 lbs./ft²

STAKEHOLDERS

Owner	CoreSite
Architect	DCM
Engineer	FBA Engineers
Contractor	MATT Construction
Steel Fabricator	ConXtech Manufacturing
Steel Erector	ConXtech Construction
ConXtech Scope	Structural Steel, Stairs, Metal Decking

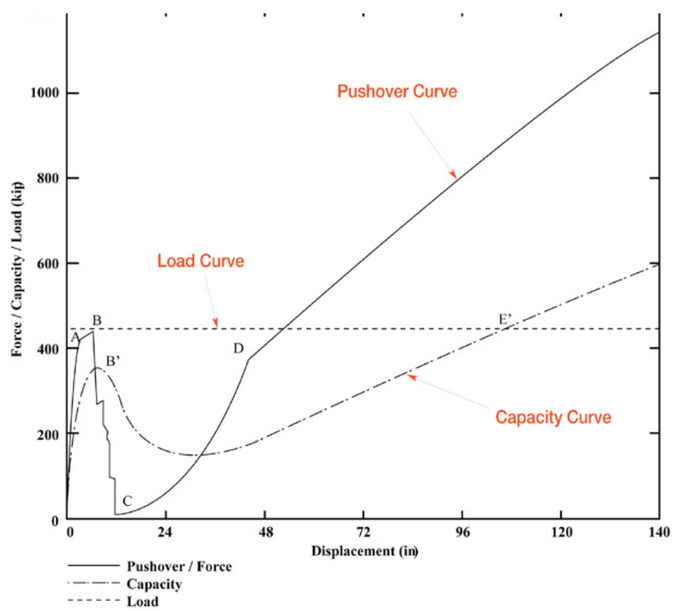
Virtually Indestructible Connection

The high strength steel box columns filled with concrete provide both local blast resistance and increased fire protection. Taken together with the forged collar assemblies wrapping around the joint that house the high strength bolts, the Bi-axial frame has the ability to resist damage without brittle failure due to its vigorous strength and toughness.

Full scale testing of the connections limit states have shown that the bolts, collar assemblies, column panel zones, and connecting welds remain essentially elastic for all of the beam sizes in the ConXtech inventory, making the connection virtually indestructible.

> "The ConXtech systems are ideal for building applications that must be designed to resist progressive collapse resulting from vehicle impact, incendiary or explosive

Source: Ronald O. Hamburger, S.E. Senior Principal, Simpson Gumpertz & Heger,



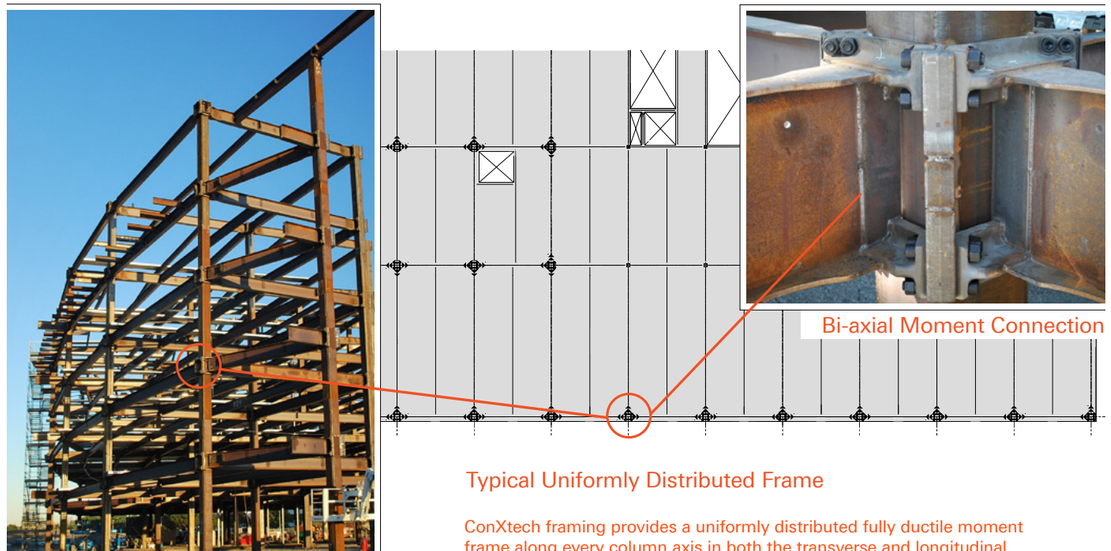
In addition to the obvious suitability for resistance to progressive collapse through the multiple alternate paths provided by ConXtech framing, the connections are also ideal for the two other UFC design approaches.

Tie force provisions are accommodated by the moment beams without the addition of reinforcing in the slab as the connection will support centenary tie forces after the collapse of the plastic hinge through tension acting through the remaining flange and its collar assembly.

A typical pushover curve for a ductile moment connection shows that immediately after the inelastic rotational capacity of the beam has been exceeded, the connection begins to pick up load due to catenary, or cable action.

Uniformly distributed moment frames prequalified through AISC testing

The ConXtech bi-axial fully ductile space frame building system is exactly what both sets of criteria envisioned.

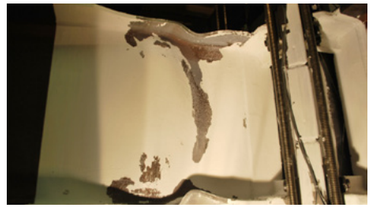


Typical Uniformly Distributed Frame

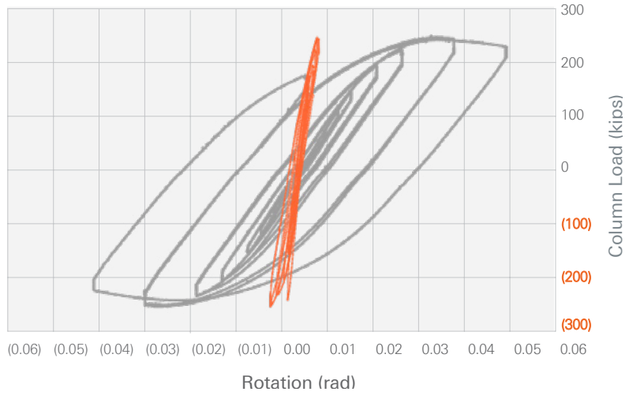
ConXtech framing provides a uniformly distributed fully ductile moment frame along every column axis in both the transverse and longitudinal directions.

Each connection is subjected to rigorous high cyclic stress that repeatedly demonstrates the connections capability to remain completely elastic while the connected beams undergo severe inelastic deformation and strain hardening

Fully Yielded Beam

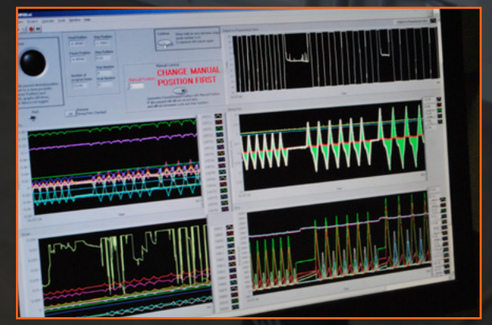


Load vs Rotation
W30x108xRBS
ConXL Bi-Axial Test #2101A.



Bi-Axial Test Frame

Our connections were tested in accordance with Chapter K of the AISC Seismic Provisions at a state of the art testing facility.



Recoverable and Recyclable

Did you know that steel is one of the most recycled building materials in the construction industry?

Any steel product, including structural steel that reach the end of its lifecycle or are no longer needed, is 100% recyclable.

Any steel decks, steel joists, steel beams, or steel doors can be recycled and used again.

And not only can it be recycled, but it can be recycled into a completely different product.

Steel is often chosen as a building material for its strength and durability, but more and more people choose it now because of its sustainability.

More than 60 million tons of steel are recycled every year in the U.S. alone.

Globally that number increases by almost ten times. It's the most recycled material.

Steel's supply chain is truly circular. Instead of going to the landfill or an incinerator, decommissioned bridges and buildings go right back to the mill to become new steel again and again.

The American Institute of Steel Construction estimates that 98% of structural steel from demolished buildings is recovered and recycled into new steel products. As such, domestically produced structural steel, which comes from electric arc furnace (EAF) mills, boasts a recycled content of 93%, according to a UL-verified Environmental Product Declaration (EPD) authored by the AISC in 2016. "A car door, a steel beam, a shipping container, or an old refrigerator could be sold as scrap and turned into a steel wide-flange beam that goes into a new skyscraper," says AISC adviser Luke Johnson.

Because EAF mills run on electricity, they largely are as green as their power source. Last September, a 19th-century Colorado steel mill owned by Russian conglomerate Evraz reached a deal with the local power utility to build an adjacent 240-megawatt solar array, which will supply a significant portion of the mill's energy. Steelmaker Nucor is building a $250 million mill in Missouri that will be entirely powered by wind. Other, similar projects are in the works.

ResponsibleSteel recently published the first version of its eponymous standard, a voluntary, international benchmark designed to support "the responsible sourcing and production of steel" and developed through a multi-stakeholder process involving manufacturers, like ArcelorMittal, and environmental advocacy groups, like Mighty Earth. Certification is based upon third-party auditing and independent panel approval.
Wenban-Smith, who helped draft sustainability standards in forestry prior to focusing on steel, wants to make steel one of the world's cleanest materials: "When the energy footprint for EAF becomes neutral, we can think of steel in a fully circular economy," he says. Realizing that dream, if possible, would likely occur first in developed nations, where large quantities of scrap are available for recycling.

Specifying Prefabrication is an Early-Procurement Decision with Special Moment Frame Systems, not for Gravity Solutions for Brace Frame Design

In the 2020 Dodge Analytics report, respondents found that early-collaboration procurement methods such as Design-Build and Integrated Project delivery "helped" or "helped significantly" on projects that utilized prefabricated systems and components.

In a nutshell, the contract type should facilitate early-collaboration and engagement with the design team, in order to align best practices. The same study reports that the number one and two obstacles to increased use of prefabricated systems is late selection or project delivery methods that don't enable such early coordination.

Introducing the system as early as the Conceptual Design phase makes pre-manufactured special moment frame systems like ConXtech XL or XR most viable. Early engagement gives our engineers an opportunity to provide critical design input when it matters most, and when it can effectively maximize efficiency of manufacturing and erection. Once the design of a building is complete, it's often very difficult to retroactively fit-out a prefabricated system like ConXtech XL or XR without significant adjustment and redesign.

On the other hand, FALCON gravity solutions for brace frame design result in the least disruption to the Client's design team and adopts the SEOR's design outright.

Top Obstacles Preventing Increased Future Use of Prefabrication and Modular Construction

Survey participants selected their top three most important from a list of factors that are preventing increased future use of prefabrication and a separate list for modular construction. Numbers in the charts reflect an index created from these responses.

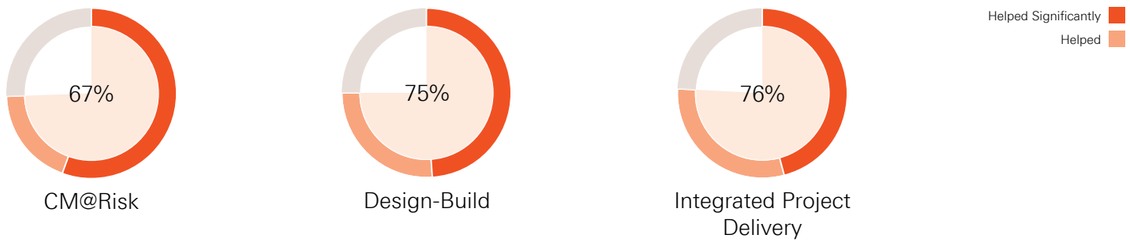
(Index Based on Responses for Next 3 Years)

Dodge Data & Analytics, 2020

Degree to Which Prefabrication was Enabled by the Project Delivery Method

(By Company Type)

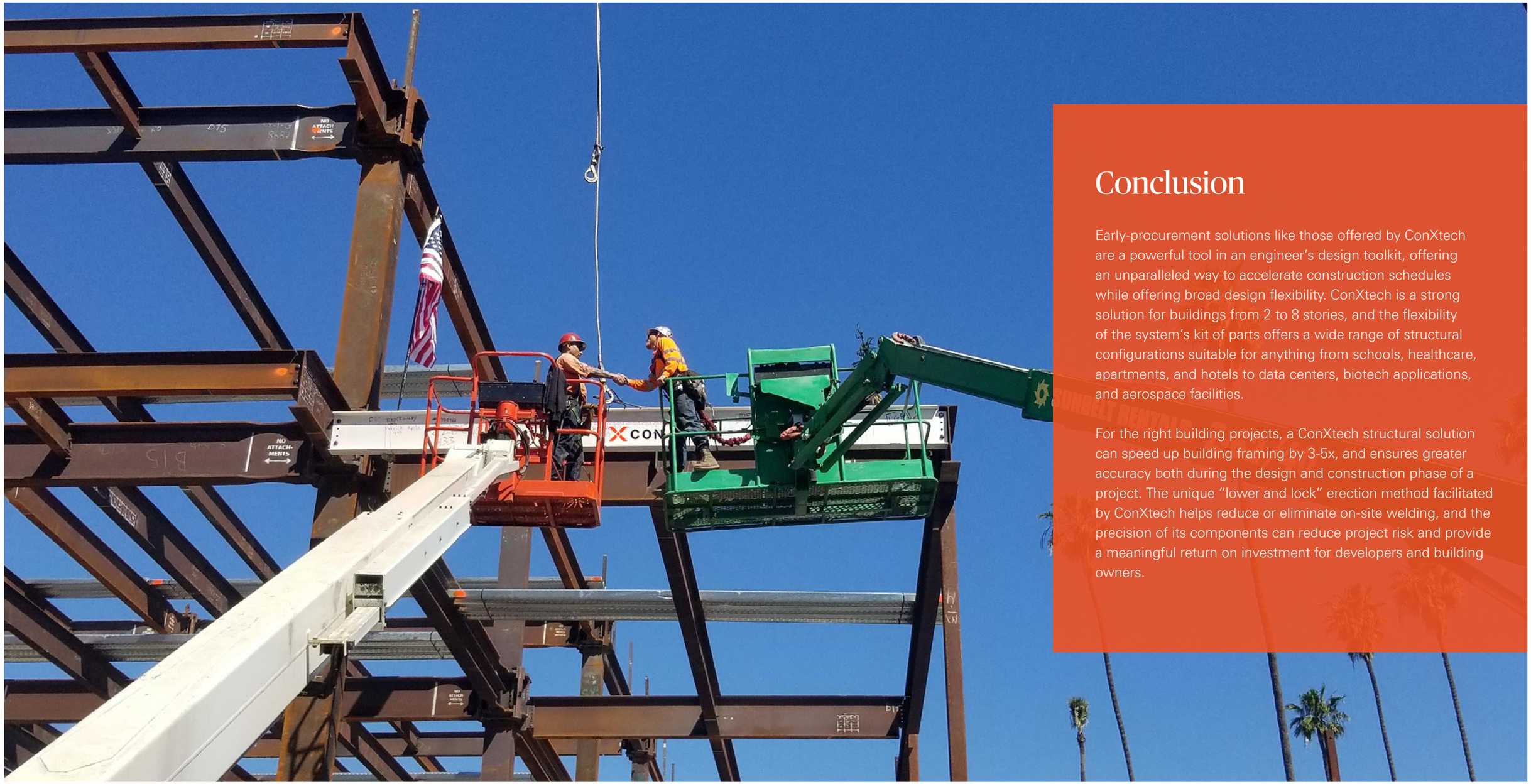
Dodge Data & Analytics, 2020



Engaging with ConXtech

ConXtech is a turnkey, manufacturing-enabled steel subcontractor with its own product engineering team. The company provides design-assist services to engineers that have been developed over years of process improvement in both the factory and on the jobsite.

When specifying a ConXtech system, design consultants engage directly with ConXtech engineers for fabrication and constructability input. ConXtech engineers can iterate conceptual drawings and optimize the design for real-world performance and jurisdictional approvals. Periodic reviews with the ConXtech team can help the EOR identify both challenges and opportunities for more efficient fabrication and erection. While final design decisions reside with the EOR, consultation with the fabricator ensures that engineers make real-world-informed decisions. If you have questions about where and how to start this process, drop the company an inquiry here: **info@conxtech.com.**



Conclusion

Early-procurement solutions like those offered by ConXtech are a powerful tool in an engineer's design toolkit, offering an unparalleled way to accelerate construction schedules while offering broad design flexibility. ConXtech is a strong solution for buildings from 2 to 8 stories, and the flexibility of the system's kit of parts offers a wide range of structural configurations suitable for anything from schools, healthcare, apartments, and hotels to data centers, biotech applications, and aerospace facilities.

For the right building projects, a ConXtech structural solution can speed up building framing by 3-5x, and ensures greater accuracy both during the design and construction phase of a project. The unique "lower and lock" erection method facilitated by ConXtech helps reduce or eliminate on-site welding, and the precision of its components can reduce project risk and provide a meaningful return on investment for developers and building owners.

For more information, please contact:

Adam Kurtenbach
Vice President of Business Development
(206) 379-4392
akurtenbach@conxtech.com

Josh DeLehman
Senior Director, Business Development
(949) 572-8345
jdelehman@conxtech.com

Jeremy Michels
Business Development Manager
Southwest USA
(214) 766.6604
jmichels@conxtech.com

Elizabeth Carey
Director of Strategy, Business Development
(510) 388-1970
ecarrey@conxtech.com

ConXtech Headquarters
6600 Koll Center Parkway, Suite 210
Pleasanton, CA 94566
T (510) 264-9111 F (510) 264-1181
CA Contractor's License N0. 855525

conxtech.com

CONXTECH®
SIMPLY FASTER

MISSION CRITICAL | DATA CENTERS

HOW CONXTECH FRAMING CAN PROVIDE AN EFFECTIVE, ROBUST SOLUTION FOR HEIGHTENED MISSION CRITICAL FACILITY DEMAND.

Engineering for Speed in the Data Center Marketplace