01

Building Better - A Systemized Approach

ConXtech is a building technology company developing and enabling a systemized and more efficient way to build - we call this system ConX®. The company has developed innovative products and processes, and utilizes twenty-first century technologies, to help the world build better, more robust and cost efficient structures. ConX structures are architecturally flexible and can be configured – or mass-customized to achieve any aesthetic vision. ConXtech brings efficiencies to the entire building process - from design, to manufacturing and fabrication, through "assembly" in the field. This technology centric systemic approach will enable the world to build more for less - sustainably.

The ConX system is often referred to as a "Full Scale Erector Set™". ConX building frames are comprised of a finite set of robust steel connectors that the Structural Engineer of Record (SEOR) designs into the structure by redundantly distributing the identically manufactured connections at nearly every primary beam-to-column intersection within the building frame. The resulting structure is a moment frame/space frame comprised of precision manufactured and factory-welded components (column and beam assemblies) which simply and safely "lower and lock" together in the field.

A ConXFrame™ is just the beginning of what we call our "Chassis Based Modular™" building system. The building frame is a precise "chassis" to which other modularized, or factory fabricated building components and systems can be added. This approach allows ConXtech to offer a particularly green, remarkably affordable and sustainable structural solution for nearly any building application including: hospital, medical office, military, governmental, high density housing, mixed-use, commercial office, data center and parking structures. ConX also provides a greener more efficient solution for a growing number of industrial applications including communications, alternative energy, pipe rack, pipeline and mining structures that can be easily assembled, disassembled and re-purposed.

02

Building Better and Higher…Affordably

Currently, ConXtech offers two discrete systems, ConXL and ConXR, which thus far have been used in 2- to 12-story structures. The urban skyline is particularly void of structures in the 5- to 12-story range because: wood is typically limited to 5 stories; concrete starts to become economically feasible when building beyond 10 or 12 stories; and conventional steel is typically more expensive than other methods of building.

ConXtech delivers seismically sound structures that can be built more sustainably and affordably than concrete or conventional steel. The ConX system allows developers to build higher than wood, enabling a parcel of land to "work harder" at 5+ stories. The cost of land is amortized across more vertical square feet. ConXtech offers owners, engineers, architects, developers and municipalities an additional tool with which to optimize land use and to build more sustainably in the urban core where public transit, retail, restaurants, commercial office and high-density residential create real and sustainable communities.

03

Leveraging Technology

ConX structural components are manufactured in highly automated factories which utilize CAD/CAM, Building Information Modeling (BIM), robotics, CNC machining, specialized fixturing and other state-of-the-art technologies. Although these technologies have been employed in the automotive, aerospace and a host of other industries for decades, the construction industry has been particularly slow to innovate or adopt technology for a variety of reasons. Now, as the world begins to recognize the value of building more sustainably, "technology" is the key to cost control and quality and will enable unprecedented collaboration and efficiencies in the use of materials, time and energy in the built environment.

04

Efficient Use of Time, Materials and Energy

- **Time**

  ConX is precision manufactured in a factory environment reducing labor in the field. ConXtech's Certified Fabricators provide a fixed place of employment - a factory rather than varying job sites, which historically have required an entire labor force to travel great distances from home to jobsite and back - only to travel to begin again at new jobsite or "place of employment" when a project is complete. This antiquated model makes it impossible for millions of workers to locate their homes near their work because their workplace is transient.

  The benefits of ConXtech's 21st Century model are abundant. "Factory manufactured" enables a majority of the construction labor force to locate their homes and families near their place of employment. Fewer miles traveled reduces waste in numerous ways including enormous savings in fuel consumption, an opportunity to use public transit or bicycle to work, and fewer hours wasted in transit. Employment near home also means more family time and time to participate in our communities.

  In the field, ConXtech assembles a structure 2X to 5X faster when compared to conventional methods and minimizes disruption to the community in which we are building. In remote or industrial applications, the savings are even more significant.

- **Materials**

  ConXtech primarily sources steel manufactured in state of the art Electric Arc Furnaces, of which 90-100% is recycled automobiles or other scrap steel. "Scrap" in a ConX factory is less than 2.5%, whereas the conventional industry is 6-8%. Lastly, similar to more conventional structural steel, all scrap then recycled.

- **Energy**

  The Electric Arc Furnace utilizes considerably less energy and resources to produce the equivalent amount of steel in comparison to the traditional integrated steel operation. ConXtech minimizes structure related waste both in the factory and at the building site. All of these things contribute to sustainability of our planet, our communities and our families. Additionally, most of the energy consumed in a ConX factory is electricity in contrast to fossil fuels that would be consumed by field welding.

05

Currently ConXtech is collaborating with others to enable additional value through a systemized approach that will bring enormous efficiencies to the industry

- Collaborating with outside subcontracting and design teams to enable modularized kitchen and bath units which can be efficiently manufactured by others and seamlessly integrated into a ConX "Chassis."
- ConX columns are ideal for receiving palletized solar and green roof systems which can be factory-built by others and added to rooftop receptacles by utilizing the vertical columns which are an integral element in ConX structures.

ConXtech is just beginning to quantify the ConXeco factor that can be realized in every phase of the building process, but for starters:

06

Conceptual Design, Architecture, Engineering and Analysis

In many cases the initial framing plan is conceived on paper from a plan view of the architect's conceptual drawings or in AutoCAD. From that point forward, Building Information Modeling (BIM) and CAD tools are employed and those drawings evolve electronically all the way through the process until the structure is fully manufactured. This does not mean that the drawings don't make it onto paper at points in time throughout the process, but ConXtech reduces the amount of paper consumed by streamlining the design process so that the initial conceptual designs are closer to "reality" from both structural and aesthetic perspectives. Less back and forth between architect and engineer reduces consumption of paper, toner and even incremental energy consumption. Conservatively, we estimate that we reduce paper consumed during the design phase by 50%. Analysis is also automated using eTabs or other software analysis tools.

07

From Approval to Detailing

Structural detailing is highly automated and checking details is accomplished electronically using a variety of CAD applications including Revit and Tekla. These tools, along with the use of oversized displays on modelers and detailers' desktops, enable cross-checking iterative updates directly from the electronic model (rather than from printed drawings.) Manufacturing data travels electronically from the model to CNC cut and drill lines. This process virtually eliminates the "shop drawings" which typically consume paper, toner and other resources. The resulting structure is precise due to the use of electronic files which greatly reduces potential for human errors that often occur in fabrication and field assembly. "What You Design Is What You Get" (WYDIWYG). This electronic process enables the design and detailing team to literally eliminate weeks and sometimes months, in the design detailing phase.

08

From Detailing to Manufacturing

ConX moment collar connector components are machined to precise tolerances using CNC machine centers, a production cell that can run "lights out" for 72 hours. ConXBeams and columns are cut and drilled by an automated cut-and-drill line that requires minimal human intervention and can produce substantially more product for the same footprint and manpower when compared to conventional methods. Welding is conducted either robotically or manually in a factory environment utilizing specialized fixturing and processes. Weather welded robotically or manually ConXtech's technologies and processes result in higher quality in significantly less time. For example, ConX robotic weld cells accomplish in 5 minutes and 35 seconds, what would take close to 3 hours in the field. ConXtech has also developed a "manual factory" comprised of fixturing along with appropriate manual processes, to achieve rapid throughput in a manual factory environment while still delivering ConX building components and assemblies with unprecedented precision and quality.

09

From Manufacturing to the Field

ConXtech's process from manufacture to the field is also streamlined. ConX structures are manufactured in the order in which the building will be assembled in a Just-In-Time (JIT) sequential fashion to minimize the need for storage of finished goods and lay-down on site.

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Reduction in Steel Reduces CO2 in the Atmosphere

Engineering with ConX has reduced the amount of structural steel by 5% to 30% when compared to conventional steel. For every ton of structural steel produced, two (2) tons of carbon dioxide (CO_2) is released into the atmosphere. Due to the redundant distribution of robust connectors in a ConX structure (resulting in a space frame); a less complex foundation can often replace piles or piers - resulting in a significant savings in schedule and foundation related materials. Additionally, in high seismic areas, there are often fewer pounds per square foot of steel in a ConXframe than just the steel reinforcement (rebar) in a concrete structure.

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Recycled and Reused ConX Packaging

The packaging used for shipping and protection of ConXR components from the factory to the field is also highly efficient and green. Precisely machined beam-end connectors are protected for shipping with recycled plywood end-caps. The end-caps protect the machined surfaces and are re-used again and again - leaving virtually no garbage, scrap or clutter on the site.

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Minimal Waste on Site

Because ConX components are pre-manufactured and factory pre-assembled to the largest extent possible, ConX creates remarkably little waste at the jobsite. There is virtually none of the conventional "cut and fit" or field welding on the structure. There is also minimal "cut and fit" of the corrugated metal decking because that material is ordered off of the BIM model, in pre-cut lengths that fit directly into the building's bays. Delivery is also seq uenced (just as the frame structure is sequenced) so that decking can be taken directly off the truck and hoisted into the structure. This choreographed approach means that in even the toughest urban environments where lay-down space is limited, the ConX system can be efficient and less disruptive to the community.

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The Ultimate in Sustainability – Disassemble, Reassemble and Repurpose

Our unique bolted collar connection makes components uniquely re-usable. The lack of weld between ConXBeams and ConXColumns means that each stand-alone column and each beam assembly can be repurposed into a completely different structure with minimal impact to our environment. In fact, ConXtech has utilized the same frame components (columns and beam assemblies) on several structural bracing projects where ConX was assembled to temporarily brace a number of historic facades while the interior was seismically retrofitted. Today, those same assemblies reside in a helicopter rescue training tower for the National Park Service in Yosemite, CA.

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