SYNCHRONICITY

DESIGN

Manufacturing & Logistics

Integrated MEP Engineering and Architectural Services for Manufacturing and Logistics Facilities

STRANG

STRANG

Established in Madison, Wisconsin in 1935, Strang, Inc has evolved into an interdisciplinary and award-winning architectural, engineering, interior design and master planning firm. Our client-centric and service driven nature has allowed us to develop long-standing relationships with industry-leading organizations of all sizes and disciplines.

Strang recognizes that your advanced manufacturing and logistic needs are profoundly different than other work spaces. That is why Strang's value proposition is unique to the industrial marketplace:

For the manufacturing firm who is expanding your product lines, our integrated mechanical, electrical, plumbing (MEP) engineering and architectural services for manufacturing and logistics facilities offer you a one stop shop for completing time critical plant improvements and additions or developing new facilities on greenfield sites.

TOP FOUR NEEDS FOR A SUCCESSFUL MANUFACTURING PROJECT

1. Optimize Delivery Methods
2. Maintain Budget
3. Schedule Adherence
4. Maintaining Continuous Operations

IN-PROGRESS DESIGN WALK-THROUGH

For 85 years, we have focused on creating synergy throughout our client's facilities increasing productivity throughout your organization. Our comprehensive design services identify client input, explore opportunities or challenges and only then, consider design direction. We keep everyone – you especially – involved from beginning to end. That's Design Synchronicity.

Strang has decades of experience working with large and small corporations alike, creating space for advanced manufacturing, warehousing logistics, laboratories, offices and food service. Our business model is vertically integrated – architecture, engineering, interior design and planning all under one roof, providing you with a team of experienced professionals. One focused, creative unit brings varied, yet aligned perspectives seeing that you receive counsel appropriate to your needs. This maximizes project productivity, minimizes waste, verifies proper decision support, improves communications, and expedites the process overall. And, we recognize the unique opportunity to integrate your team into the design process with us!

MANUFACTURING & LOGISTICS FACILITIES EXPERIENCE

Strang's advanced manufacturing and logistics experience features a multitude of different sectors including process, product, biotechnology, pharmaceutical, and advanced robotics manufacturing. Each of these unique spaces have been tailored to ensure that every square foot is being utilized as effectively and efficiently as possible. The spaces we design empower our clients to maximize the most advanced manufacturing and warehousing systems possible. Our designs ensure that you maintain the flexibility to accommodate multiple product needs or entirely new products.

Nord Gear

Nord Gear South Expansion

GE Lunar Medical Device Equipment Manufacturing and Warehousing

Electronic Theatre Controls

Madison College Ingenuity Center

NelNet

Alliant Energy Center, New Holland Pavilion (Flexible Warehouse)

Scientific Protein Laboratories

COMAR Plastics

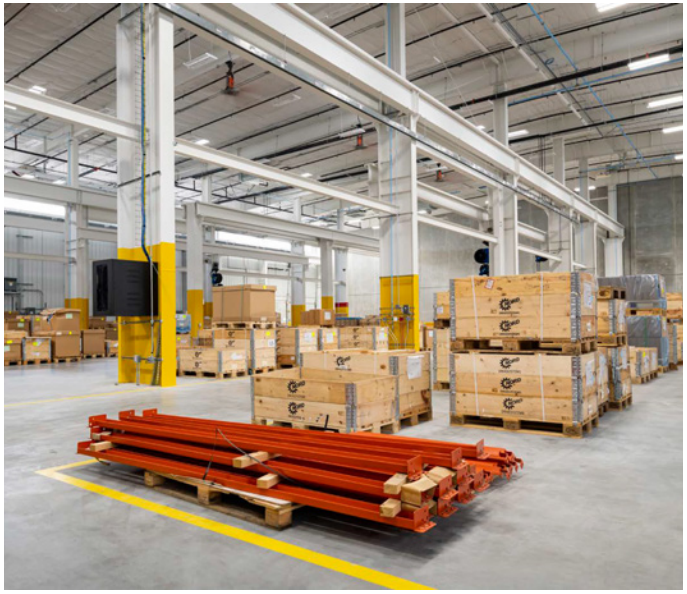
SAFC- Tetronics Research Production

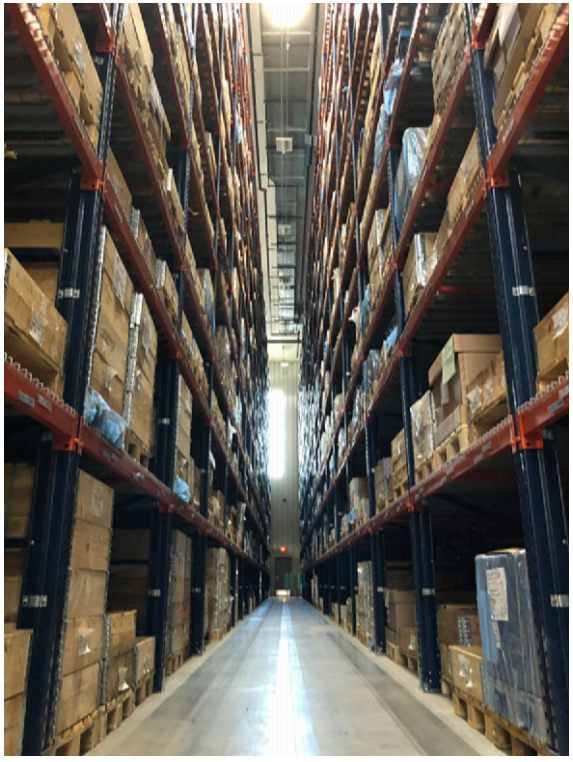
SSI Technologies

Eurofins Food Solutions

STRANG CASE STUDIES

NORDGEAR
MADISON, WISCONSIN





NORD Gear is a world leading manufacturer of drive technology for mechanical and electronic solutions. They implement the latest in lean manufacturing processes to ensure high-quality products and responsive support.

Strang designed the new $14.7 Million expansion of their North American headquarters. The 90,000 SF multi-phased project was completed without interruption to daily operations. This manufacturing space has allowed for increased production capabilities and brought their machining department up to industry standards.

A key component of this project is a state-of-the-art overhead material handling system to ensure safe, efficient, and highly productive movement of the facility's drive and electronic components. Additionally, this system streamlined the loading and unloading process within the new interior loading dock facility.

With the increased production, NORD Gear needed to expand their storage capabilities. Strang incorporated a 18,500 sf VNA (very narrow aisle) pallet racking system. The racking system allowed storage up to 43 feet.

Now, NORD Gear has additional space for assembly, testing, and service of large industrial gearboxes. Local assembly also allows for faster product delivery and more flexibility. Strang's design empowered NORD Gear to respond quickly to the needs and specifications of customers within a facility that their skilled assemblers and expert engineering team will enjoy working in.

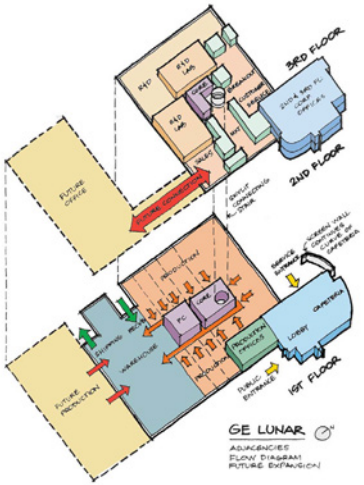
GE MEDICAL SYSTEMS, LUNAR

MADISON, WISCONSIN

GE Medical Systems, Lunar is a leading developer and manufacturer of innovative medical devices for the assessment of osteoporosis, metabolic bone disease, and orthopedic surgery. Originally known as Lunar Corporation, this innovative startup company encountered explosive growth in personnel and operations. This motivated a collaboration with Strang to design a new 167,000 SF headquarters and knowledge-based manufacturing and logistics facility to meet their existing and future space needs.

Planning for flexibility and future growth were key values paramount in the design and construction of this building. Future expansion of the production area was planned to be a mirror image of the Phase 1 Production area. The design team anticipated this by integrating structural footings into the floor of the warehouse area. This was to support a future bridge that would connect the original 2nd floor R&D area to the new R&D floor above the future production area (see adjacencies flow diagram). As the company continued to grow, the facility was expanded successfully in line with the original master plan.

One of this client's core values for this knowledge-based, vertically integrated, advanced manufacturing facility was the close connection and collaboration between R&D and production. In order to maximize the value of efficiency, the entire production line and warehouse is located on a single floor. Similarly, the corporate building functions are each located in close proximity to the others based on the level of collaboration between the departments.

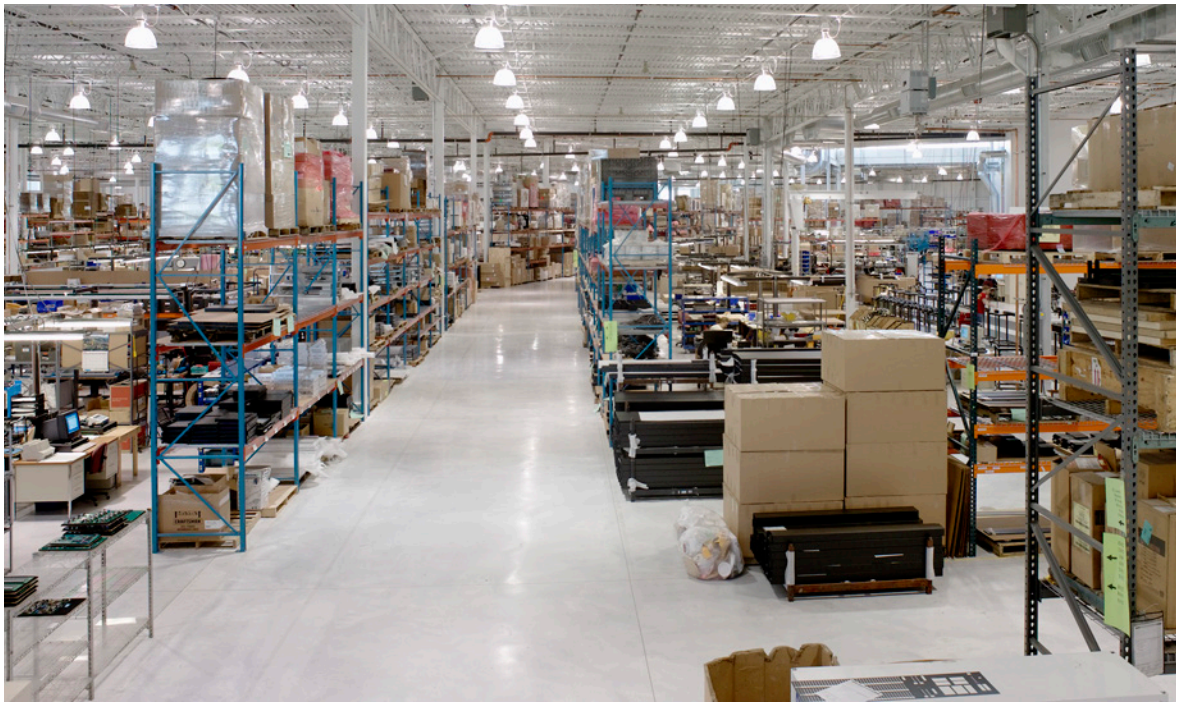


Adjacencies Flow Diagram

Planning for flexibility and future growth were key values paramount in the design and construction of this building, as evidenced in the development of the production and warehouse facility.

ELECTRONIC THEATRE CONTROLS

MADISON, WISCONSIN



This 250,000 SF, $18.5 million, corporate headquarters houses Electronic Theatre Controls' (ETC) administrative, R&D, and manufacturing operations. In order to optimize ingenuity, R&D areas balance the need for collaborative team space and individual private workstations to accommodate multiple working styles. Likewise, in order to optimize employee comfort and productivity, the manufacturing space is not only designed specifically for logistical efficiency, but also filled with natural daylighting.

The building reflects ETC's corporate culture and vision throughout and emphasizes its connection to theater and the lighting industry.

The design team prioritized ordinary, economical, off-the-shelf materials, used in extraordinary ways. This creatively reinforced the design goals of the project while remaining cost-conscious. Some of these so-called "ordinary" materials became feature elements of the building: inexpensive industrial expanded steel mesh was used extensively throughout the building as exterior sun shading, rooftop screens, guardrails, and even as theatrical scrim for the stage sets in the town square.

Before this facility, ETC occupied nine different buildings; uniting the workforce and building trust by minimizing the chasm between the manufacturing employees and the office employees became a major goal for the project. The public spaces of the building provide the glue that encourages interaction and collaboration among all employees. This project succeeded in creating a new manufacturing and headquarters facility that met ETC's goals, needs, and vision within the constraints of the budget.

NELNET

MADISON, WISCONSIN

NelNet, formerly Great Lakes Higher Education approached Strang with a challenge. “Can you design a 20,000 SF stand-alone print center building to house our new advanced high-production printing operations at a construction cost of less than $2,000,000 and have the facility up and running within 12 months?” It was a challenge we accepted without reservation. Utilizing a pre-manufactured building shell for speed of construction, we created a thermal and vapor controlled interior environment necessary for proper paper storage and printing equipment operations. The project was completed on time, on budget, and fully operational within the client’s desired timeframe.

Strang assisted the client by establishing a detailed workplan, describing all necessary critical path tasks necessary to meet their demanding schedule. We organized a qualification and fee based, competitive general contractor selection process. With the general contractor engaged early in design, it was possible to pre-order long-lead items including the pre-manufactured metal building for just-in-time delivery to the site, optimizing construction sequencing. This project represents economical, highly functional design with fully integrated infrastructure for the client’s unique operations.

DESIGN

MADISON COLLEGE INGENUITY, TRANSPORTATION AND ADVANCED MANUFACTURING CENTER

MADISON, WISCONSIN

Madison College is a long-term client of Strang's, having completed dozens of projects over the last 20+ years.

The Ingenuity Center is a state-of-the-art, $20.5 million, 62,000 SF advanced manufacturing training facility that focuses on hands-on experiences, helps the college shape passionate, agile, and driven students. The design of this facility expresses the product life cycle from start to finish: beginning with idea generation, research & design, the circulation through the facility progresses through rapid prototyping, material testing, CNC manufacturing, packaging, and warehousing.

In order to provide a window into the journey of a product at every step along the way, classrooms are located directly across from the corresponding section of the manufacturing facility, facilitating enhanced, hands-on, active learning. Dozens of studies of advanced manufacturing spaces have revealed that workers are happier, more productive, and more fulfilled in spaces with generous daylighting—for this reason, the design team employed both skylights and clerestory windows to provide ample daylighting throughout the manufacturing spaces.

Constant innovation was a key design element for this manufacturing space to be flexible and easy to modify. High bay spaces facilitate relocation and reconfiguration of equipment, and flexible overhead utility connections throughout the entire manufacturing floor allow work to take place anywhere.

The design of this facility expresses the product life cycle from start to finish: beginning with idea generation, research & design, the circulation through the facility progresses through rapid prototyping, material testing, CNC manufacturing, packaging, and warehousing.

COMAR

WEST BEND, WISCONSIN

For over 70 years, Comar has been a premier supplier of high-impact packaging and medical solutions with their custom molding machines. Recently, Comar outgrew their previous 25,000 SF facility and needed to relocate to accommodate their growth and increase efficiency. Their new 160,000 SF facility is their largest facility in Wisconsin.

Comar's new facility is ISO 9001 certified and features high-tonnage molding machines, high-cavitation molds, press-side automation, high-bay crane operations, high-bay storage, office support spaces, and training spaces. This site provides specialty packaging, including stock extrusion blow-molded containers, injection-molded lids and closures, and a wide variety of engineered custom products and assemblies.

Comar selected the new site and teamed up with Strang to implement the design. The biggest factors in this project were understanding Comar's flow of operations, the weight and storage needs of the equipment, and future ease of growth throughout the space.

This new building has tripled Comar's footprint allowing them to add an array of advanced manufacturing capabilities. Strang provided a modernized space with improved floor layouts, breakrooms, and dedicated training facilities for employee development.

Our engineering team provided updated systems including high-efficiency water and air systems and LED lighting designed with the ability to easily expand as growth requires. The team seamlessly managed unanticipated changes throughout the project timeline. This included needing to demolish and repair the existing concrete and update the floor plans halfway through the schedule due to the addition of a new extrusion blow molding room. Strang pivoted with the stakeholders to keep the project on schedule and deliver solutions that fit the exact needs of the client.

> *"If we ever have to expand or build from the ground up, I would love to work with Strang again."*
> *– James Spalding, West Bend Plant Manager*

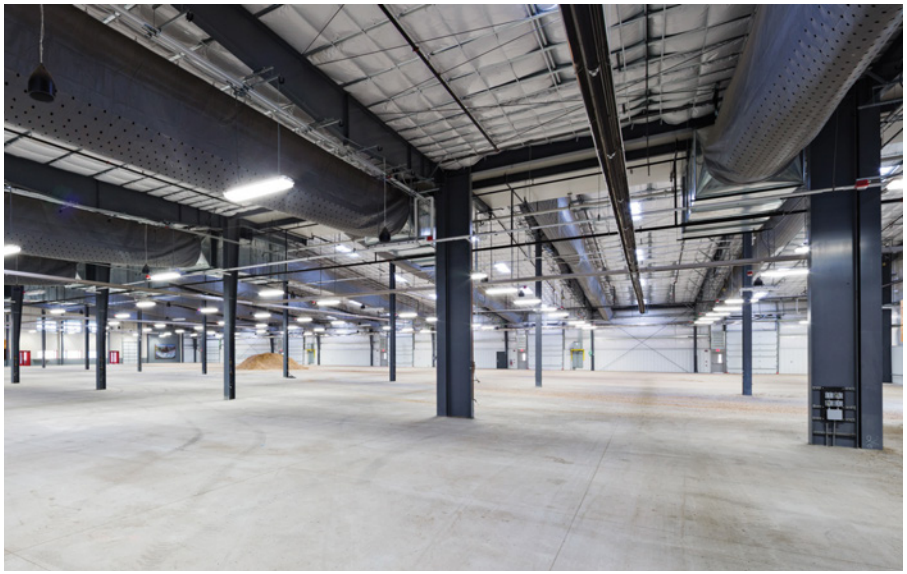
CORBI PLASTICS

DEFOREST, WISCONSIN

CORBI Plastics, a joint venture between Cartonplast and ORBIS Corporation, provides companies with an efficient method to move their products throughout the supply chain — faster, better, safer, and more cost-effectively. Strang designed the new 85,000 SF, $4 Million headquarters in the DeForest Industrial Park. The company manufactures polypropylene products, which are utilized in a variety of applications, such as layer pads for beverage and food containers.

The one-story, precast and metal panel facility includes an office suite, warehouse and production areas and partial mezzanine. The simple, clean design features an accent over the entrance. Natural light is brought into the space through clerestory windows and skylights.

ALLIANT ENERGY CENTER, NEW HOLLAND PAVILION MADISON, WISCONSIN



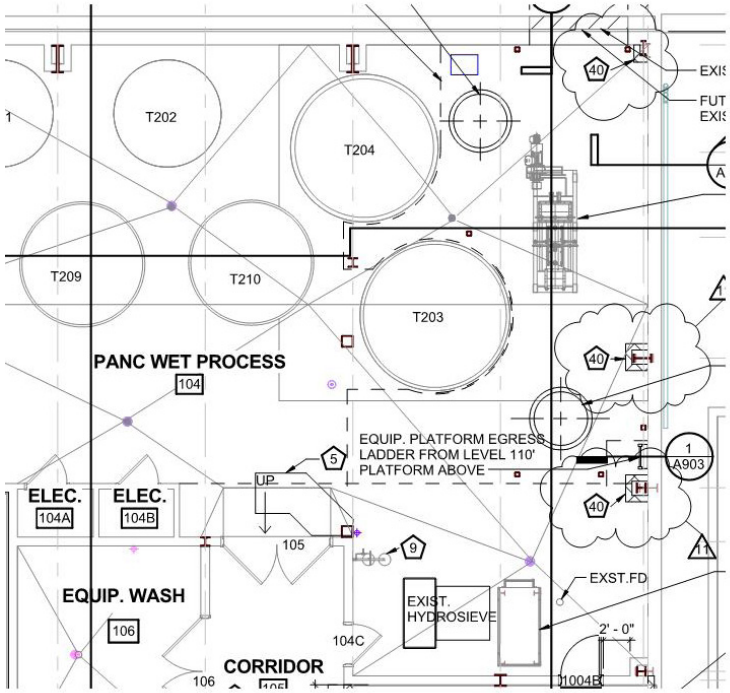
The New Holland Pavilions are widely recognized as the most advanced multi-purpose pavilions in the country. They offer a world-class 290,000 GSF of space for a wide range of national livestock, equine, and athletic events such as the Midwest Horse Fair, World Dairy Expo, and Cross-Fit games. The Pavilion 2 measures 200,000 SF, allowing additional space for livestock stalls, restrooms and the 20x12 walk-through BouMatic Milking parlor.

This multi-use facility replaced the site's former 12 aging agricultural barns. Pavilion 1, a 90,000 SF building, includes nearly 8,000 SF of pre-function space. The remaining 80,000 SF provides ample space for livestock stalls, wash bays, and restrooms with showers. A major challenge in the required design was the construction schedule. Two major events, the Mid-West Horse Fair in the spring and the World Dairy Expo in the fall, needed to proceed uninterrupted. As such, design was required to be completed within a 3-month period, allowing construction to occur between these two events. Strang completed the design on time and administered the construction of the two pavilions over a six-month period. The major events occurred without interruption, preserving the center's cash flow while upgrading their facilities to world-class status.

The building envelope and structural system was developed for economy and speed of assembly, utilizing pre-fabricated and modular techniques, but not at the expense of aesthetics. The large scale of the pavilions allowed for custom pre-fabricated configurations creating unique and attractive forms at a construction cost of $24 million.

SCIENTIFIC PROTEIN LABORATORIES

WAUNAKEE, WISCONSIN



New 18,000 SF of both wet and dry process areas

Scientific Protein Laboratories (SPL) is a world leader in the development and cGMP-compliant manufacturing of pancreatic enzymes, heparin and its analogs for over 30 years. The two story cGMP clean bio-pharmaceutical manufacturing facility consist of 22,000 SF of both wet and dry process areas and mechanical support facilities.

Strang designed SPL's new cGMP clean bio-pharmaceutical plant addition. This fast track project delivered an enclosed building in five months from the initial conceptual design. Strang provided a full range of architectural and engineering design services for this client.

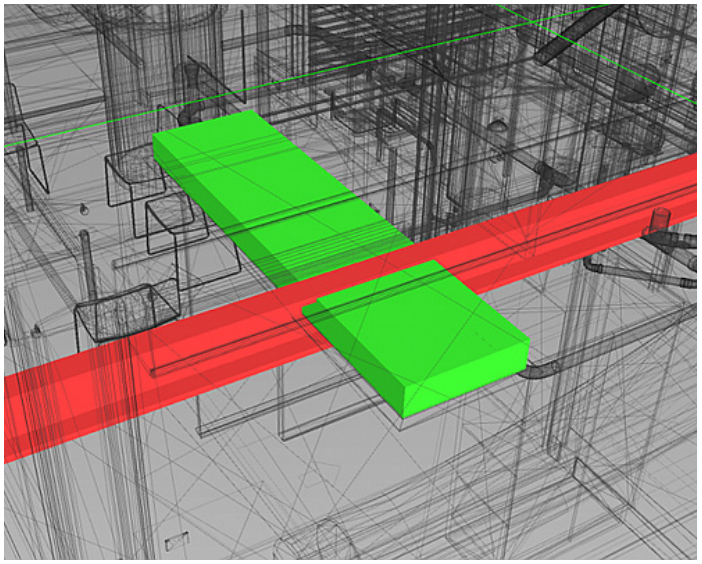
Strang has also completed renovations and additions for raw/bulk pharma materials for both wet and dry process areas, these additional projects involve both renovations and additions to provide production spaces for raw/bulk pharma materials for both wet and dry process areas. The projects included bulk tank systems ranging in size from 300 to 5,000 gallons, lyophilizer spaces, bulk storage of materials, WFI system, cold rooms, freezers, and other support areas.

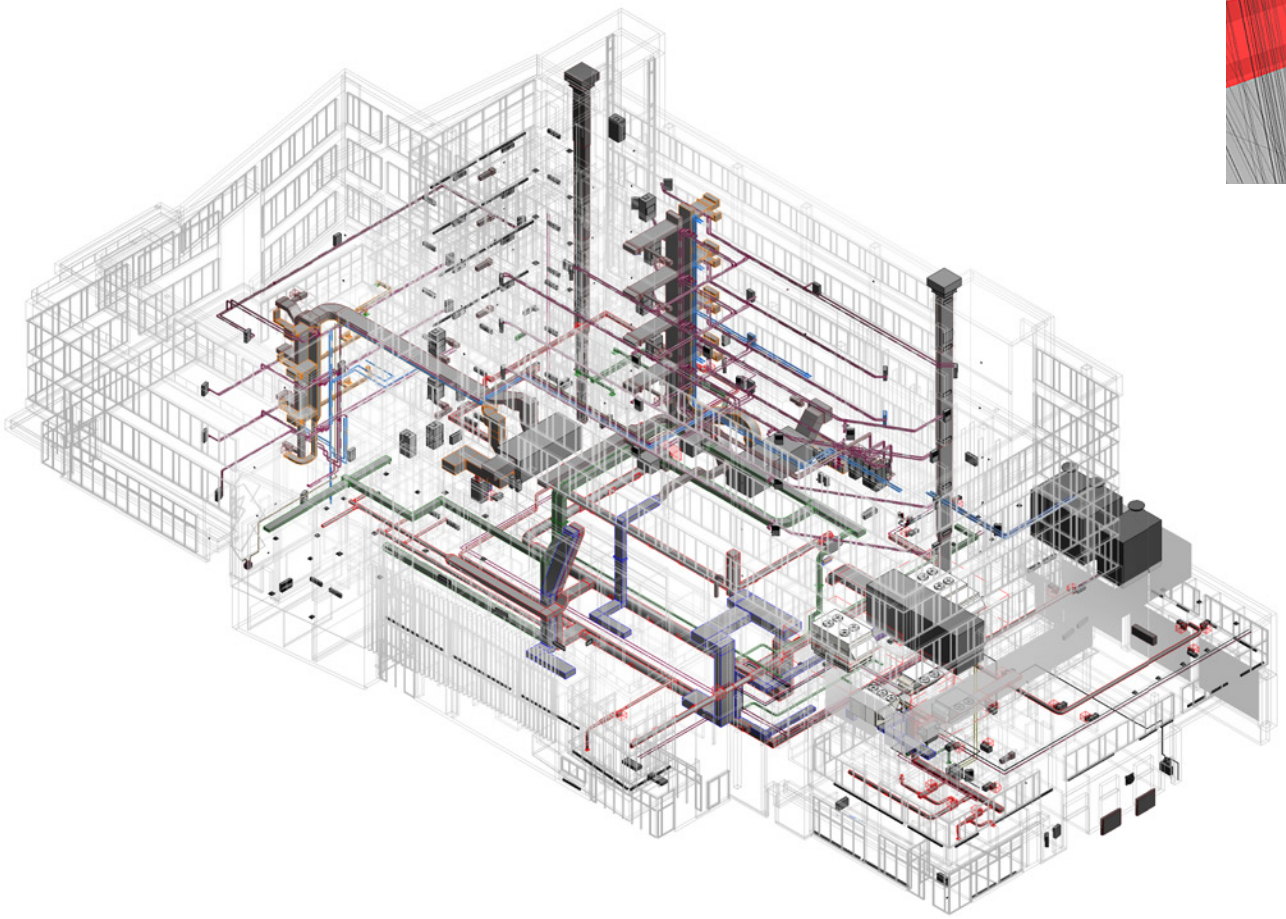
Strang's longterm relationship with SPL accounts for over $23 Million in construction costs across their numerous projects.

ADVANCED COORDINATION

Strang has mastered the art and science of Building Information Modeling (BIM) integration. As our primary design tool, we perform BIM modeling at the start of every project. As your model takes form, it is used as a visualization tool, allowing the team to view inside any room to get a sense for proportions, scale, and the visual impact of design creating a synchronized client experience.

Our integrated engineering and architectural services approach respects your schedule while maintaining your budget and on-going operations.





In later design phases, the model is used as a coordination tool between disciplines. We use Navisworks software to run "clash detection" tests. These conflicts are resolved in BIM prior to construction avoiding costly change orders and schedule delays.

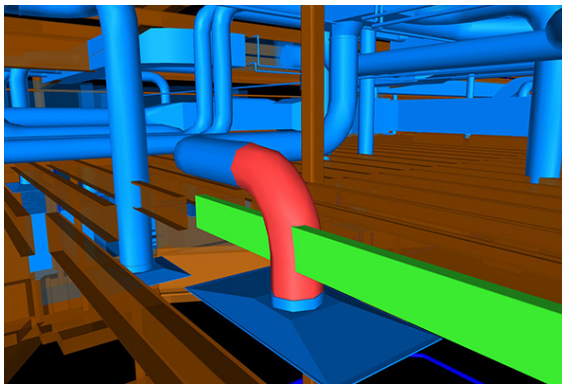
DESIGN VISUALIZATION

VR facilitates a coordinated design solution. Our designers use the tool to confirm the building design components "fit" together for a cohesive design solution.

In the end, VR saves time, money and ensures a successful project.

Virtual reality is more than a cool new way to see architectural renderings in 3-D. At Strang, we don't use technology for technology's sake, but rather as another means to bring our client's perspective into the design process. By directing their own view from room to room, clients use the VR headsets to find out if the space "feels" right. This helps assure designers and clients are on the same page so adjustments can be made earlier and more accurately. It saves time and money, and ensures a successful project.

Manufacturing facilities often require integration of complex processes that fully utilize space in three dimensions. Design visualization tools enable careful coordination of the manufacturing systems with building systems avoiding conflicts and providing maximum utilization of the built space.



PROJECT DEVELOPMENT

LISTEN | DISCOVER | DESIGN

Our team collaborates to identify client input, explore opportunities and address challenges, and only then, considers design direction. Strang's project development is highly collaborative and inclusive. Stakeholder participation is conducted in open communication and we implement a proven interdisciplinary system. Decisions are viewed in a holistic manner and Strang develops trusted solutions reflecting your goals and budgets. Strang's proprietary protocol, Listen | Discover | Design ensures stakeholders actively participate in conceptualization of the project.

Within Strang Exists An Instinctive Respect For Client Collaboration.

Our role extends well beyond traditional planning, programming and designing. We become proactive catalysts for your growth, stewards of your business and champions of your brand. Our clients are as diverse as their locations and each has a unique purpose.

LISTEN

Great design engages all your senses. At Strang, the sound of your voice is important as we listen for intensions to understand the thinking behind your words. Together, we will develop a concept matching your organization's unique objectives.

DISCOVER

When our designers work together to collect, review and analyze your input, we discover the many unique opportunities inherent in your project. This evaluative step challenges thinking and allows "Next Practices" to surface.

DESIGN

In our design phase, we communicate the ideas and insights that clients, architects, engineers, and designers are all able to contribute to a unified plan of action. As we steward your vision and culture, you are engaged as co-creators, resulting in a design that perfectly fits your budget, schedule, and mission.

PROJECT MANAGEMENT

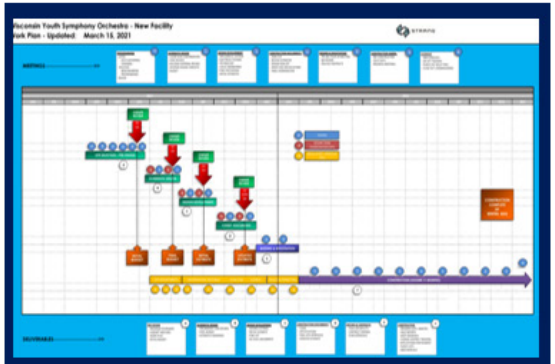
We believe in a highly collaborative and inclusive approach to project management, we regularly collaborate with clients and selected contractors to ensure design intent and integrity is understood. We achieve this by implementing a proven interdisciplinary system that fosters open communication and encourages stakeholder coordination.

Decisions are made in unison with the entire team; **experience proves this saves time and money.** Strang professionals develop trusted solutions that reflect and respect your goals and budgets. As a means of easily sharing information, we establish a project website that allow project communications, drawings and graphics to be readily available to each stakeholder. Every action necessary to ensure transparency, consensus and understanding is taken.

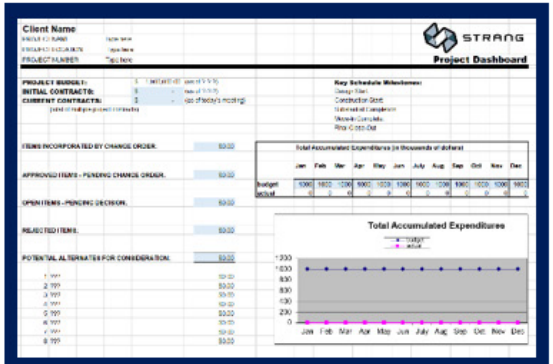
Strang offers a fresh vision and diverse design solutions with a client-focused approach. Our design process effectively defines project requirements and maximizes value. We offer an exclusive, by-design, disciplined and accountable methodology to project development and management making sure our client's budget, schedule, and input is top priority. We vigorously seek out opportunities where adjustments can be made to schedules and budgets in order to provide the most efficient and cost-effective solutions.

COMMUNICATION FLOW STRATEGIES

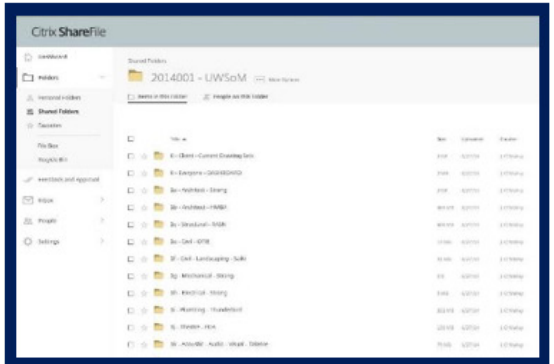
- Utilizing electronic survey tools for data collection.
- Regular bi-weekly workshops pre-scheduled months in advance.
- Agendas sent electronically in advance of workshops
- Dashboard utilized as a central resource for documentation of decisions and progress
- Share File site utilized as the primary repository for shared project information and current drawings.
- An actionable quality control and coordination plan



PROJECT WORK PLAN



PROJECT DASHBOARD



PROJECT INFORMATION SITE

INTEGRATED DESIGN SERVICE

From our humble beginnings over 85 years ago, Strang has had a simple credo: engineering and architecture must work together collaboratively to produce exceptional designs for our clients. Our designs also account for respectful use of financial, natural, and human resources.

From advanced manufacturing to automated warehousing, we consider the needs of all types of industrial facilities. As Strang has evolved to better serve our clients, we have added interior design and master planning to our primary services. These services, and almost a dozen more, compliment our primary focus for our manufacturing clients: leading the design and construction of facilities that will profitably produce and warehouse products.

Our diverse team of engineers provide comprehensive analysis offering innovative solutions for your production needs. We develop options to provide you with the very best value for your investment and schedule constraints.

Our expert architects are adept at designing built environments that celebrate growth. We build upon your vision with a forward-thinking mentality anticipating tomorrow's needs while meeting today's budgets and capacity requirements.

Our interior design team aligns your productivity, culture, and creative energy within beautifully functional space empowering building occupants to do their best work.

STRANG SERVICES




ENGINEERING

- Integration of Process/ Manufacturing Systems
- HVAC System Design
- Plumbing Design
- Electrical System Design
- Lighting Design
- Commissioning
- Integrated Control Systems
- Energy Performance Modeling
- Safety and Fire Protection
- Maintenance Programs
- Site Analysis/Quick Fit
- Mechanical Systems Analysis
- Cost Estimating
- Start-Up Assistance
- Long-Range Programming
- Voice, Data, Security, AV Design
- Structural Engineering Code Compliance
- Proforma/Financial Budgeting

ARCHITECTURE

- Master Planning
- Site Evaluation/Selection
- Architectural Design
- Feasibility Study
- Project Scheduling and Implementation
- Construction Administration
- Construction Phase Delivery Method Strategy and Contractor Selection
- Existing Building Evaluation
- Cost Estimating
- Value Analysis
- LEED Consulting
- WELL Building Consulting
- Virtual Reality (VR) Design
- Computer Aided Facility Management (CAFM) Support

INTERIOR DESIGN

- Interior Program Development and Workplace Strategy
- Renovation Planning
- Interior Design Concept Development
- Interior Materials and Finish Selection
- Branding of the Interior Environment
- Furniture Selection and Furniture Bidding
- Interior Architectural Detailing
- Building and Accessibility Code Reviews and Compliance
- WELL and LEED Compliant Consulting, Design, and Administration
- Ergonomic Assessments

CONSTRUCTION

- Design/Programming Review
- Bidding Assistance
- Construction Phasing Review
- Coordination of Review Boards/ Permits
- Field Observations and Reports
- Facilitate Construction Progress Meetings
- Evaluate Construction Changes
- Field Surveys
- Budgeting/Scheduling
- Space Planning
- Coordination With Appropriate Review Boards / Permits
- Move Planning and Implementation
- IT and Network Planning
- Commissioning
- Contractor Coordination and Communication

Our Integrated Services Approach Respects Your Schedule While Maintaining Your Budget and On-going Operations

That is why we strive to provide an exceptional client experience through mutual respect, resource preservation and inspired design.

After all, every project we touch is forever a part of our shared legacy.

STRANG

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