

4th DIMENSION DESIGN, INC.

A STRUCTURAL ENGINEERING FIRM



STEEL

wood

CONCRETE

design

METAL BUILDING SYSTEMS

masonry

investigation



4th DIMENSION DESIGN

Company Profile

Founded in 1986, **4th Dimension Design, Inc.** is a structural engineering firm specializing in low-rise, non-residential buildings.

Our core engineering practice is based on technical excellence, practical solutions and exemplary responsiveness to our clients. Our professional engineers are knowledgeable experts who develop quality, cost effective design solutions that our clients trust with each new project.

Our services include complete structural design and drafting services for:

- architects
- design-build contractors
- owners

We also offer innovative solutions for existing buildings, including assessing field conditions and recommending solutions for:

- collapses
- partial failures
- roof leaks
- explosion damage
- building modifications
 - additions
- retro fit roof and walls

We provide investigative engineering services for owners, contractors, fabricators, lawyers and insurance companies.

4th Dimension Design provides design and drafting services for the metal building industry.

- high complexity buildings
- industry assistance during peak loads



Our Four Principles for Successful Projects

Quality-driven

4th Dimension Design's professional engineers are knowledgeable experts, developing **quality, cost effective design solutions.**



Innovative

Our team of experts will **solve your most challenging structural issues**, working directly with builders, material suppliers and architects.



Timely

Project timelines are critical. Your project, large or small, will receive **personal attention** and **professional results.**



Responsive

From preliminary design and bidding, right through to last minute changes on the construction site. **Get the answers you need, when you need them!**



John Rave, P.E. - President

Education

- Marquette University - B.S. Civil Engineering

Instructor

- Economic design of Low Rise Structures

Registrations & Professional Affiliations

- Registered Engineer -
Alabama, Arkansas, Colorado, Delaware, Georgia, Maryland,
Massachusetts, Minnesota, Mississippi, Missouri, New Mexico,
North Carolina, Oklahoma, Oregon, Pennsylvania, South Carolina,
Tennessee, Texas, Virginia, Wisconsin
- The National Society of Professional Engineers (NSPE-WSPE)
- Metal Building Manufacturers Association (MBMA)
Chairman - Technical Committee
- Associated Builders & Contractors, Inc. (ABC)
Board of Directors
Membership Committee
ABC Representative Industry Advisory Committee (IAC)
for International Code Council (ICC)

Experience

- 50+ years
General Manager of Engineering (Inryco Inc., Milwaukee, WI)
Owner/President - 4th Dimension Design, Inc., founded in 1986

John Peterson, P.E., S.E. - Vice President

Education

- University of Wisconsin, Platteville, WI - B.S. Civil Engineering

Registrations & Professional Affiliations

- Registered Engineer -
Arizona (SE), Florida, Illinois (SE), Indiana, Michigan, Nevada,
New York, Utah (SE), Washington, Wisconsin

Experience

- 45+ years
Vice President - 4th Dimension Design, Inc. since 1986

John R. Groh, P. E., S.E.

Education

- Milwaukee Area Technical College, Milwaukee, WI - Associates Degree in Applied Science in Civil Technology
- Marquette University - B.S. Civil Engineering
- Marquette University - M.S. Civil Engineering

Registrations & Professional Affiliations

- Registered Engineer - California, Connecticut, Idaho, Illinois (SE), Iowa, Kansas, Kentucky, New Jersey, New York, North Dakota, Ohio, South Dakota, West Virginia, Wisconsin, Wyoming
- Member American Society of Civil Engineers (ASCE)
- Member American Concrete Institute (ACI)
- Member American Institute of Steel Construction (AISC)

Experience

- 30+ years
Senior Design Engineer, 4th Dimension Design, Inc. since 1998

Joseph E. Moha, P.E.

Education

- University of Wisconsin, Madison - B.S. Civil Engineering
- Cornell University, Ithaca, NY - M.E. Structural Engineering

Registrations

- Registered Engineer - Florida, Louisiana, Maryland, Montana, Nebraska, New Hampshire, North Carolina, South Carolina, Vermont, Virginia, Wisconsin

Experience

- 38+ years
Senior Design Engineer, 4th Dimension Design, Inc. since 2002

Joel Nelson, P.E.

Education

- Milwaukee School of Engineering - B.S. Structural Engineering

Registrations

- Registered Engineer -
Wisconsin, Indiana, Michigan

Experience

- 10 years
Design Engineer, 4th Dimension Design, Inc. since 2003

Projects of Distinction



Ethanol Plant -

Green Plains, WI - 70,000 sq. ft. complex - 9 buildings

4DD Design:

Metal building foundations, tank and equipment foundations.

Riverwalk -

Fort Atkinson, WI

- Riverwalk, sidewalks, retaining walls, overhangs and monument.

4DD Design:

Retaining walls, river wall, monument foundation.

Design Type:

Structural steel, cast in place concrete.



Projects of Distinction



Concession Building -

New Jersey Motorsports Park - 8,800 sq. ft.

4DD Design:

Metal building design and detailing.

Design Type:

Structural steel, lt. gauge framing, metal wall panel, "arched" standing seam roof, segmented rafters and variable length purlins and clips.

U.S. Foodservice -

Ogden, UT - 280,000 sq. ft.

- High seismic area, food storage facility with Dry, Cooler and Freezer warehouse.
- Office and truck maintenance buildings.
- Refrigeration equipment support framing.

4DD Design:

Foundation, roof and wall framing, mezzanines and equipment platforms.

Design Type:

Structural steel and concrete.



Projects of Distinction



Stayer House -

Elkhart Lake, WI - 13,200 sq. ft.

- Tile roof, concrete floor system with integral floor heating system, custom design steel balconies.

4DD Design:

Foundation, retaining walls, floor framing, roof and wall framing.

Design Type:

Wood, structural steel, concrete, precast concrete plank and masonry.



Systems Control - Electrical Building -

Custom design electrical enclosure, factory built and outfitted for "Plug and Play" on site installation. Each enclosure is individually designed to meet the requirements of the local building code.

4DD Design:

Structural steel



Projects of Distinction



Quad Graphics -

Sussex, WI - 50,000 sq. ft.
Lomira, WI - 70,000 sq. ft.

- Automated rack storage buildings, over 100 feet tall.

4DD Design:

Concrete Mat Foundation



St. Mary Church -

Hales Corners, WI - 25,000 sq. ft.

- Engineered wood framing
- Glass and brick veneer
- Remodel of existing church into multi-level office and classroom space.

4DD Design:

Foundation, retaining walls, exterior walls, modify existing building.

Design Type:

Structural steel, wood, masonry and precast concrete.



New Buildings

The following is a sampling of new buildings 4DD has designed.

M&I Bank - Pewaukee, WI - 2,700 sq. ft.

- Brick and block bearing walls
- Wood truss roof system
- Concrete plank floor
- Vault support

Pinahs Bakery - Pewaukee, WI - 40,175 sq. ft.

- Precast concrete bearing walls
- Truss girder and joist roof system
- Tank support

Knight Manufacturing - Brodhead, WI - 50,476 sq. ft.

- 3 Separate building extensions
- Metal building system
- Cranes: 15 TON - 55 ft. span
5 TON - 37 ft. span
5 TON - 25 ft. span
3 TON - 25 ft. span
3 TON - 17 ft. span
- Existing building modification for crane and snow drift.

White Pine Lumber - Romeoville, IL - 32,100 sq. ft.

- Metal building system
- Precast concrete drying kiln
- Heavy warehouse storage load

Cross Roads Shopping Center -

Menomonee Falls, WI - 8,900 sq. ft.

- Beam and joist roof construction
- Fit between 2 existing buildings
- 2 Walls existing
- 1 Wall bearing CMU
- 1 Wall steel and glass

J.W. Speakers - Germantown, WI - 45,000 sq. ft.

- Truss girder and joist roof system
- Reinforced masonry walls

Michael's Cooperage - Chicago, IL - 60,000 sq. ft.

- Metal building system
- Enclosed shipping dock
- Offices - CMU & precast concrete plank

Ayres Chevrolet - Brodhead, WI - 13,790 sq. ft.

- Metal building system
- Wood and steel mezzanine
- Service area, offices and showroom

Northeast Corporate Center -

Glendale, WI - 28,000 sq. ft. (2 buildings)

- Truss girder and joist roof system
- Steel stud and brick fascia
- Bank with vault - tenant modification
- Glass walls

Sunrise Point - Green Lake, WI - 12,700 sq. ft.

Parking Garage

- Precast concrete plank
- Precast interior beams and columns
- Site cast exterior walls

Metal Craft of Mayville - Mayville, WI - 32,000 sq. ft.

- Metal building system
- 10 Ton crane - 40' span
- Steel joist & standing seam roof
- Deep concrete pit
- Recessed truck dock

Patrick Cudahy - Cudahy, WI - 65,000 sq. ft.

- Precast concrete – double T roof system
- Precast columns and beams
- 2 story building
- Cold storage – foam insulated walls

Beaulieu of America - Aiken, SC - 240,000 sq. ft.

- Truss girders and joist roof system
- Precast concrete – load bearing double T walls

Mayville Engineering Corp. -

Mayville, WI - 70,000 sq. ft.

- Truss girder and joist roof system
- Precast concrete load bearing walls
- Suspended mono-rail crane
- High bay bridge cranes

Repair and Retrofit

The following is a sampling of repaired/retrofitted buildings 4DD has designed.

Gilman Engineering - Janesville, WI
50,940 sq. ft. retro fit roof systems

- Sub framing system and a metal building's beam and purlin system, both with standing seam panel. Both over different types and ages of existing buildings.

Alloway - Westgo, Fargo, ND

- Analysis of existing structure for added monorail system.
- Analysis of twisted column.
- Change building wind bracing for additional door.

Bonnie Castle Resort - Alexandria, NY

- Determined load capacity of existing structure.
- Modifications necessary to meet current building code.

Plastronics Plus Inc. - East Troy, WI

- Metal roof with sub-framing installed over existing built-up roof.

Future Foam Inc. - Middleton, WI

- Modified existing structure to support snow drift caused by new structure being erected.

Mid-Way Supply - Zion, IL

- Modified existing beam and 15' O.C. column wall to a 60' clear span wall.

Stelrema Corp. - Knox, IN

- Checked building and crane supports for increase in crane capacity and recommended modifications.

Knaak Manufacturing - Crystal Lake, IL

- Beefed up existing structure for snow drifting caused by new adjacent building.

Delta Airlines, Inc. - Atlanta, GA
13,600 sq. ft. retro fit roof system

- Cura framing system.
- Standing seam roof panel.

Dover Air Force Base - Dover, Delaware
11,700 sq. ft. retro fit roof system

- Cura framing system.
- Standing seam roof panel, hip and valley roof.

Brandon Meats - Brandon, WI
2,400 sq. ft. freezer

- Remove old and built new.
- Reinforce and replace existing wood trusses.

Silgan Container - Waupun, WI

- Remove and relocate building columns.
- Minimum plant interruption, no shoring.

Kerry Ingredients - Owen, WI

- Add large precast concrete equipment mezzanine.
- Remove main building columns.
- Cover existing courtyard with precast concrete roof.
- Equipment pits.

Speed Queen - Ripon, WI

- Add equipment foundations with access pits below.
- 250, 500 and 1,000 Ton presses.
- Electrical panel mezzanine.

Investigation

The following is a sampling of 4DD investigative work.

Issue: A building collapsed near Richmond, Virginia under snow load.

As the expert for the manufacturer we determined that the design was correct. The field investigation showed that the foundation was not properly installed. All parties agreed to the convening of a technical expert conference on the matter. The case was settled as a result of the conference report which set the blame on the foundation problem.

Issue: A building in Richmond, Virginia, approximately 10 years old, had some roof leaks and the owner wanted a new roof.

As the expert for the contractor we showed that the roof was only in need of a minor amount of repair. The judgment against our client was less than his last offer to settle.

Issue: A portion of a building in Dutch Harbor, Alaska collapsed under snow load. The portion of the structure that collapsed was designed to carry a heavier load than the balance of the building that did not collapse.

Our field investigation of the site showed that the end of the building that collapsed was in the shadow of a high cliff that had been blasted into the side of a mountain. The drifting of the snow on the building caused by this condition had not been considered in the design. The weather reports for the island of Dutch Harbor showed that the wind direction would have caused drifting for about the week before the collapse. As a result of our report all parties agreed and there was no litigation.

Issue: The endwall of a building located in Willmar, Minnesota collapsed from grain load.

Our field investigation uncovered that the grain had been stored to a height 4ft. higher than was specified. We prepared calculation that showed stress levels in the endwall columns were at 53% to 70% over allowable. Our report assisted in avoiding any litigation.

Investigation

The following is a sampling of 4DD investigative work.

Issue: The entire roof of a grand stand in a small town near Chicago, Illinois blew off the main frames of the stands. The roof system, nearly intact, was carried 200 yards and wrapped around another building.

Site investigation did not reveal any other damage to other building's at the fair grounds. The evaluation of the site condition and testing done at the University of Wisconsin, Milwaukee lead to the conclusion that an isolated tornado would be the only way such a incident could have happened. What makes this such an unusual conclusion is that it was in the middle of December, it was snowing, but there were reports of lightning and thunder in the area at the time the roof blew off. Suit by uninsured owner was settled.

Issue: An explosion in a steel fabricating plant in Lincoln, Nebraska sent plates of steel thru the roof, opening large holes. As the plates re-entered the building, back thru the roof, smaller holes were also made.

We were hired to determine the extent of damage and what parts of the building needed to be replaced or repaired. Our report developed two methods of repair, patching the holes or replacing the roof. Because of the business interruption cost, the replacement of the roof option was selected. Roof was replaced without significant interruption to work.



quality-driven

Innovative

RESPONSIVE

TIMELY

4th Dimension Design, Inc.

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