



**Software & Services**

**QUALITY LIGHT STEEL FRAMING MEMBERS AND CONNECTIONS**

# Software and Services

## TSN Value Engineering Services



**Services** Plan & Specification Reviews  
Project Recommendations  
Final Construction Details  
Blast & Progressive Collapse Resistant CFS Design

## Cold formed Steel Design Software



**SteelSmart<sup>®</sup> System Software**

## Non-linear Structural Analysis Software



**Extreme Loading<sup>®</sup> for Structures Software**

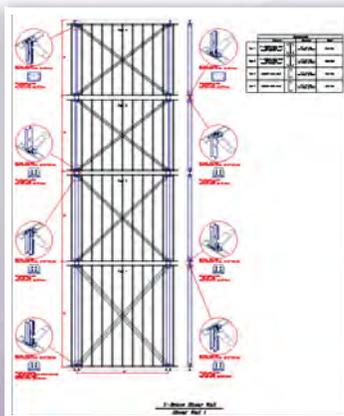
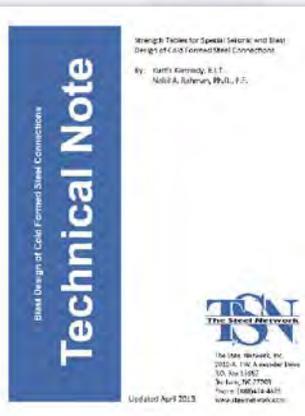
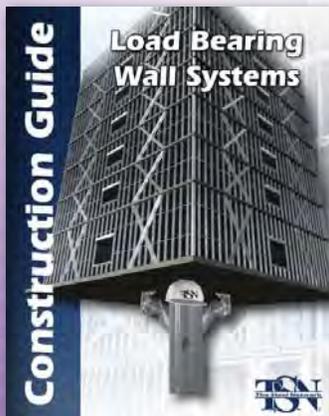
## ASI Structural Engineering Support Services



**Services** Blast Design Configurations  
Progressive Collapse Compliance  
Wind-Seismic-Blast Requirements  
Cost Saving Numerical Analysis  
Demolition Planning  
Specialized Structural Expertise

## Leveraging the TSN Advantage

The Steel Network, Inc. provides solutions for all standard light steel framing applications. It is TSN's goal to provide the best value, while ensuring safety and efficiency. Toward this end, TSN provides a host of resources and opportunities to support the successful design, optimization, and implementation of your next light gauge (cold-formed) steel project. Contact us or visit our website to find out how TSN can find savings on your next project.



### Technical Resources Available:

- Value Engineering/Product Optimization
- Technical Support
- Custom Connection Testing
- CAD Details
- BIM Objects
- Blast & Seismic Solutions
- Lab Test Reports
- ICC-ES Evaluation Reports
- Technical Notes
- LEED<sup>®</sup> Data Sheets
- Material Safety Data Sheets (MSDS)
- Submittals & Approvals
- Component Design for Blast

For all of our technical information, visit [www.steelnetwork.com/Site/TechnicalData](http://www.steelnetwork.com/Site/TechnicalData)

# Load Bearing Wall Systems

## Value Engineering Services

### Introduction:

The Steel Network's competitive advantage lies in the cost savings, rapid construction and green design/construction options provided by its core product lines, used in its Load-bearing Building System. TSN will partner with the project team to recommend the best solutions to fit project conditions. **Our Value Engineering (VE) services** apply at any point in the project; from the Architect, Engineer of Record, General Contractor, Sub-Contractor, Specialty Engineer (Shop Drawer), to the Distributor. Each member of the team can partner with TSN to determine the best course of action for the project.

### Value Engineering Services

- Plan & Specification Reviews
- Engineered Solutions
- Project Recommendations
- Final Construction Documents Details
- Referral to Experienced Specialty Engineers
- Blast Resistant Cold-Formed Steel Assembly Expertise
- Extensive Experience with Progressive Collapse Requirements

### Value Engineering Results

- Lower overall project costs
- Material cost savings in the wall system
- Reduced foundation requirements and cost
- Accelerated construction schedules
- Meet code requirements
- Fewer subcontractors on the job
- Satisfied Developers, Contractors, Structural Engineers and Architects

## Realize the Benefit of Cold Formed Steel Framing

### Benefits of TSN's Value Engineering Consulting Services

- **Cost** Consulting services are available to the Project Team at any point in the process.
- **Faster Construction Time** TSN's VE services & quality products often result in accelerated construction.
- **Optimization** TSN will optimize the materials used for the wall system. Minimizing the amount of steel members can lead to savings within the project.
- **Flexibility** The Design and Construction Team is empowered to determine the best foundation, floor, and roof systems for the project.
- **Simplification** TSN's VE services facilitate the use of CFS in buildings as the structural load bearing wall and lateral bracing components.
- **Scheduling** Owners are able to start generating revenue upon project completion.
- **Liability** TSN Products are engineered to meet project specifications and manufactured from mill-certified steel.
- **Design Tools** Technical product information is provided to the members of the Project Team. Design software (SteelSmart® System) is also available online at [www.steelSMARTsystem.com](http://www.steelSMARTsystem.com).



## Project Spotlight: Hilton Garden Inn, Southpoint, Durham, NC



1<sup>st</sup> Floor: January 17



2<sup>nd</sup> Floor: January 25



3<sup>rd</sup> Floor: January 31



4<sup>th</sup> Floor: February 7



5<sup>th</sup> Floor: February 15



6<sup>th</sup> Floor: February 21



This six-story Hilton Garden Inn was originally designed with concrete block as the axial load bearing wall element. **TSN's Value Engineering Services** determined that by switching to SigmaStud, overall materials used would be reduced by 80%! This reduction in bearing weight resulted in the utilization of a traditional thickened slab in place of a larger, thicker foundation. By combining it with TSN's StiffWall to address shear forces, the structural components were erected in six weeks rather than the 3.5 months it normally would have taken with the concrete block material.

### 6 Story Structure

**General Contractor:** Snively Building Company  
**Sub-Contractor:** RGC, Inc  
**Architect:** Gordon & Greenberg, Inc.  
**EOR:** JD A Engineers, Inc.

# SteelSmart® System 7

With 2012 IBC & ASCE 7-10

**The industry's #1 tool for the design of Members, Connections, Fasteners & Details**

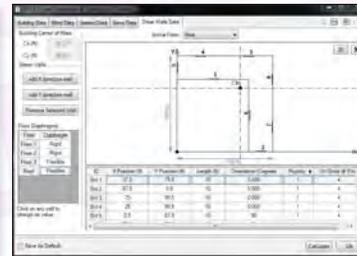
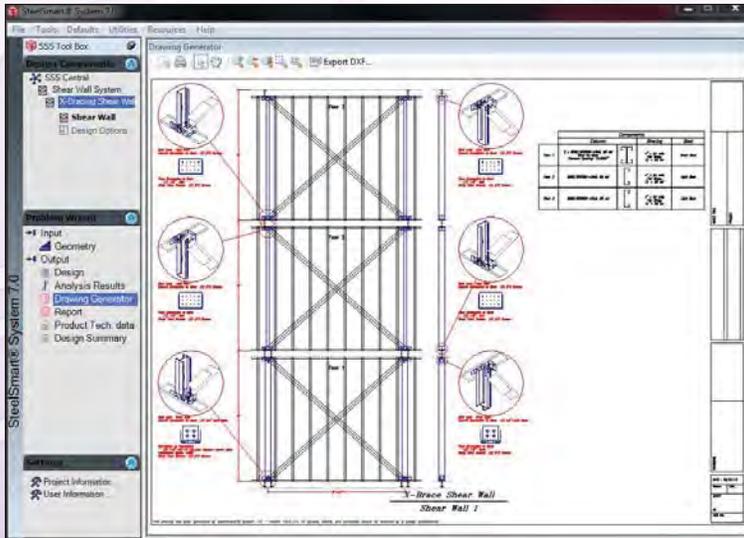
### Introduction:

SteelSmart® System (SSS) provides construction professionals with an essential tool engineered for both fast and accurate design. SSS 7 raises the bar for light steel framing analysis and design by seamlessly integrating the well-known analytic power of its predecessors with additional functionality and accessibility.

Available as a complete suite, SteelSmart System 7 will streamline production through the design and detailing of members, connections, and fasteners. Available design modules include: Curtain Wall, Load Bearing Wall, X-Brace Shear Wall, Floor Framing, Roof Framing, Roof Truss, and Moment-Resisting Short Wall. SSS 7 incorporates two Advanced Features, the Load Generator and Distributor and the Layout and Connection Details Generator, that further aid the user in the design process.



**Order online at [www.steelSMARTsystem.com](http://www.steelSMARTsystem.com)**



### Load Generator and Distributor

The Load Generator and Distributor tool uses the dimensions and load specification for a building to calculate the lateral wind and seismic forces according to ASCE 7 "Minimum Design Loads for Buildings and Other Structures." Now included in the Load Generator is the IBC 2012 and ASCE 7-10 design codes for development of lateral forces and snow loads. The output from the load generator gives the laterals forces distributed between floor levels and the shear walls at that floor level. The method of distribution considers either rigid or flexible floor diaphragms, while considering torsional effects when rigid diaphragms are selected. Output can be exported directly into the

X-Brace Shear Wall design module or into an Excel spreadsheet.



### Layout and Connection Details Generator

A major feature of SSS is the Layout and Connection Details Generator. The framing layout of components is generated with connection details that include connection design data (clips designations, number of fasteners, embedment lengths, and screw patterns). The drawing generator is included within all 7 primary design modules, and will create a detail upon successful design of components. The drawings can be printed or exported in the AutoCAD® DXF format allowing the drawings to be easily transferred into other drafting software.

In addition to the Layout and Connection Details generator, there is also a library of component details within SSS. Details are split into 7 categories including: Curtain Wall, Load Bearing Walls, Shear Walls, Products Details, Floor Framing, Roof Framing, and LSF Systems.



**Contact ASI for licensing information:**  
**Phone:** (919) 645-4090  
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**Email:** [support@appliedscienceint.com](mailto:support@appliedscienceint.com)

# EXTREME LOADING® FOR STRUCTURES

## Introduction:

Extreme Loading for Structures Software (ELS) is a commercially available software package that allows engineers to design to as built conditions and real-world threats creating both economical and robust performance based designs, rather than taking a more costly prescriptive code approach. Showcased in a recent white paper written regarding progressive collapse analysis, it was shown that ELS can save up to 40% on the structural system. The result is that buildings that are not only built stronger but also greener. Extreme Loading® for Structures delivers high-end structural analysis capability in a practical and engineer-friendly package.

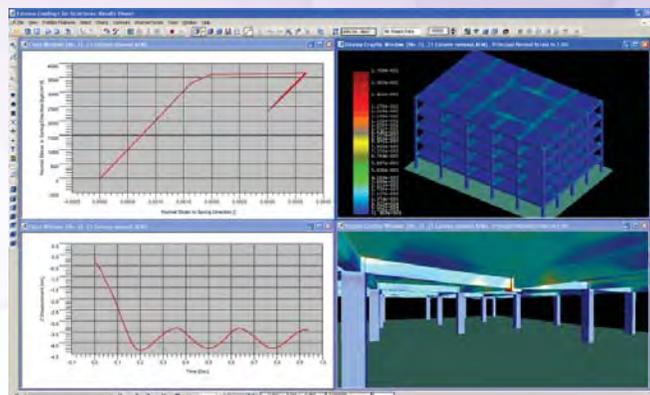
## *The Practicing Engineer's Solution for Advanced Nonlinear Dynamic Analysis*

### Analysis Features

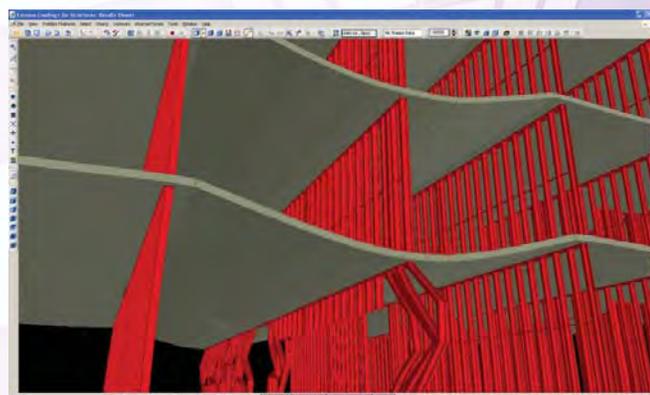
The Applied Element Method (AEM) based solver in Extreme Loading® for Structures 3.1 is a derivative of the Finite Element Method (FEM) and the Discrete Element Method (DEM). AEM is capable of performing both linear and nonlinear analysis that follows the behavior of structures through separation, collision and collapse while automatically considering:

- **Yielding of Reinforcement:** calculates material strain from elastic to plastic deformation.
- **Plastic Hinge Formation:** automatically places plastic hinges.
- **Buckling and Post-buckling:** calculates elastic and plastic bending under compressive loads.
- **Crack Propagation:** calculates the location and propagation of cracks.
- **Membrane Action & P-Delta Effect (P-Δ):** calculates the dynamic force and displacement caused by Membrane Action and the P-Δ Effect.
- **Separation of Elements:** separates elements based on nonlinear material properties.
- **Collision & Collapse:** calculates collision & collapse of separated elements.

For Structural Engineers, this means assumptions typically required for such advanced analysis are eliminated. Defining plastic hinges is not necessary. Cracking, separation and collisions will occur automatically.



Automatic Yielding of Reinforcement



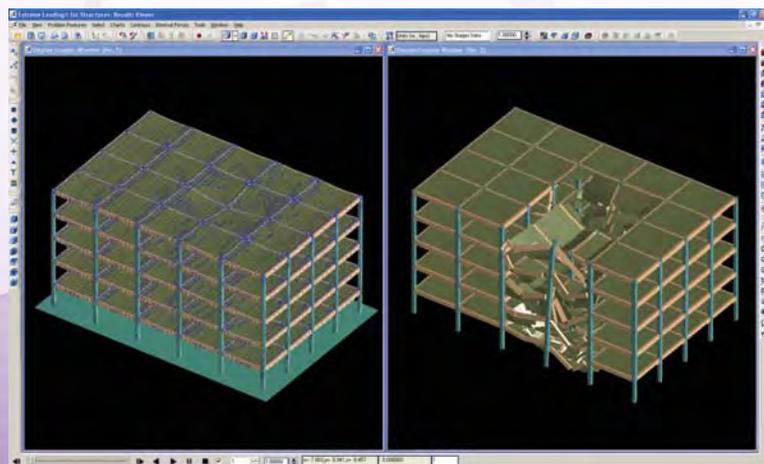
Automatic Membrane Action & P-Δ Effect

### Modeling Features

- **Full 3-D Modeling:** build and modify your models in a 3-D environment
- **Pre-defined Styles (Building Components):** saves time by allowing the user to edit standard building components rather than creating them from scratch
- **Custom reinforcement:** model custom reinforcement bars, variably spaced stirrups, and steel sections
- **Built-up Steel Sections:** convert draft objects into steel sections
- **Automatic mesh adjustment & connectivity between elements:** element connectivity is generated by the program without user-intervention, saving precious time typically lost due to complex issues

### Output Viewer Features

- **Eigen modes:** view animated periods and frequencies for all mode shapes of the model.
- **Custom Internal Force Diagrams:** create animated internal force diagrams for components, levels, or the whole structure taking into consideration cracks, rebar, yielding and other phenomena that occur during loading.
- **Contour Diagrams:** create animated stress, strain, and kinematics contour diagrams for components, levels, or the whole structure.
- **Charts:** allow users more control over all aspects of charts and the ability to animate charts to follow the steps of the analysis.
- **Movie Generation:** add text and markers to \*.avi and \*.bmp.



Automatic Crack Propagation

Automatic Separation



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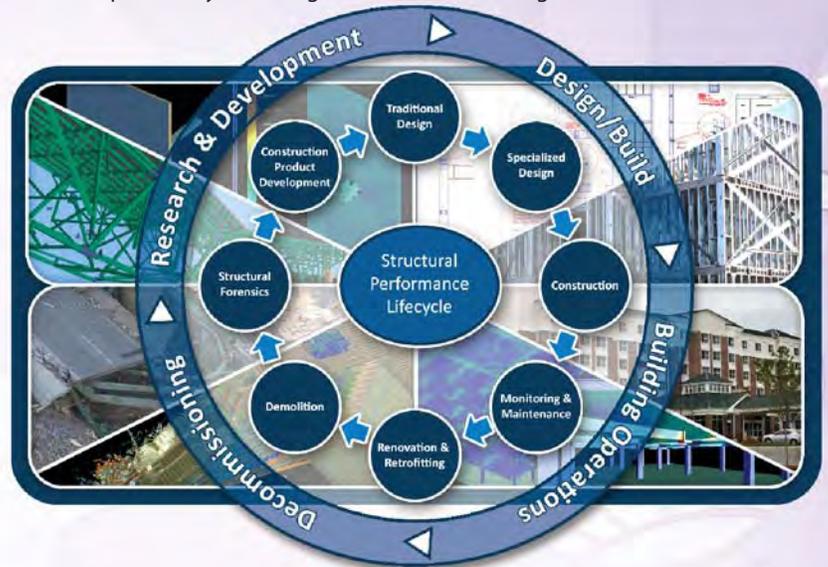
## Uncompromising Resilient Design:

At Applied Science International (ASI), our focus is on the development of practical solutions through simplifying the process, not the analysis method. These solutions help the practicing engineer to design greener, more efficient structures which can not only provide significant cost savings, but design structures that better ensure the safety of its occupants.

When studying a problem, Engineers look for ways to provide accurate solutions that are practical to the allotted time, budget, construction materials, and technology available. The result has been the use of prescriptive code requirements paired with analysis solutions that sacrifice accuracy through simplified methods and analysis. To account for these simplifications, factors of safety are typically included to ensure any potential inaccuracies in the design are addressed. This approach results in potentially oversized structures with higher construction and maintenance costs.

The performance lifecycle of structures is a frequently discussed issue within the engineering community due to a range of challenges which include: aging infrastructure, recurring man-made and natural disasters, new construction materials, environmental sustainability, and the introduction of BIM.

With the integration of BIM into the design of structures, the performance based life-cycle analysis is becoming an integrated process. This process looks at all phases of a structural system from design, to maintenance, extreme events, rehabilitation, and eventual demolition or forensics. With recent advances in ASI's structural analysis technology, simplified analysis is not the only economical solution. In fact, in many cases it is costly when compared to a performance based analysis of the entire structure. These solutions can result in the reduction of structural cost, decrease the construction timetable and increase security of the structure against performance requirements.



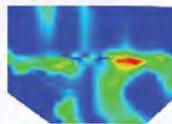
*Make better decisions throughout the structural lifecycle by more accurately analyzing and visualizing structural health for resilience and the cost/benefit of robustness.*

## About Applied Science International

Since 2004, Applied Science International (ASI) has focused on creating tools for engineers and scientists to help optimize and analyze structures. When it comes to specialized design, extreme loading conditions, or structural failures, ASI's team of veteran engineers and scientists provides a collective wealth of hands-on experience in engineering research, software development, analysis, and design. With ASI's proprietary Extreme Loading® Technology (ELT), it is able to provide superior non-linear dynamic structural analysis and 3-D visuals, replacing current practices which rely on simplified analysis with many assumptions.



ELS Analysis Results of the I-35W Bridge Collapse



Initial Gusset Plate Failure

## ASI Services

- Performance Based Design
- Cold-Formed Steel Design
- Historic Preservation
- Custom Software Development
- Demolition Analysis and Planning
- Renovation, Rehabilitation, and Retrofitting
- Structural Building Information Modeling (BIM)
- Blast, Impact, Progressive Collapse, Seismic, and Wind Analysis
- Forensic Engineering, Accident Reconstruction and Expert Witness



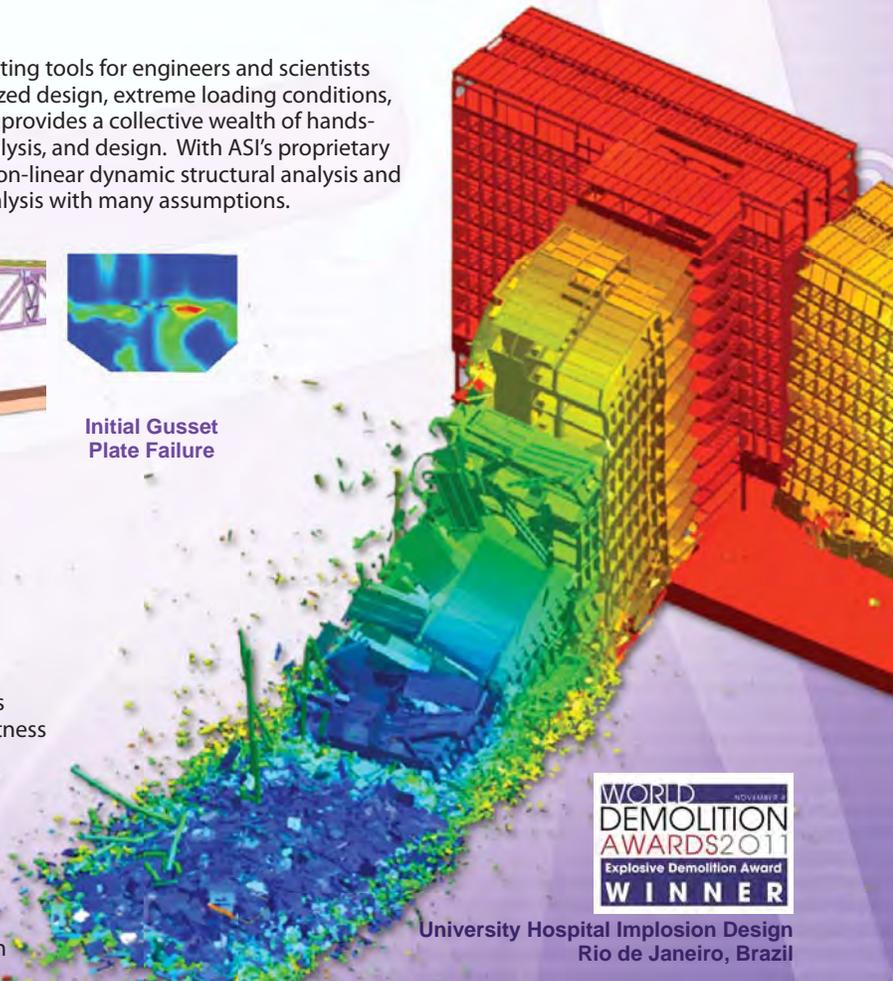
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University Hospital Implosion Design  
Rio de Janeiro, Brazil

# Terms, Conditions, and Limited Warranty

## Product Use

Products in this catalog are designed and manufactured for the specific purposes shown, and should not be used in other applications unless approved by a qualified design professional. All modifications to products or changes in installation procedures should be made by a qualified design professional. The performance of such modified products or altered installation procedures is the sole responsibility of the design professional or installation contractor. The installation contractor and/or qualified design professional are responsible for installing all products in accordance with relevant specifications and building codes.

Customers modifying products or installation procedures, or designing Custom products for fabrication by The Steel Network, Inc. ("TSN") shall, regardless of specific instructions to the user, indemnify, defend, and hold TSN harmless for any and all claimed loss or damage occasioned in whole or in part by Custom or modified products or installation procedures.

Modifications to TSN products, improper loading or installation procedures, or deviations from recommended applications will affect TSN products' load-carrying capacities. TSN products are fabricated from hot-dipped galvanized steel for corrosion protection but will corrode and lose load-carrying capacity if exposed to salt air, corrosive fire-retardant chemicals, fertilizers, pressure treated wood or other substances that may adversely affect steel or its galvanized coating. This document edition reflects changes in the allowable loads and configurations of some of TSN's products. This information supercedes information in earlier documents or technical reports. All earlier documents or technical reports should be discarded and reference made exclusively to this edition. TSN may correct any clerical or typographical errors. All sales are subject to TSN's standard terms and conditions of sale.

## Limited Warranty

TSN warrants its products to be free from defects in material or workmanship at the time of shipment. TSN standard catalog products are warranted for adequacy of design when used in accordance with design limits in this document and properly specified and installed. This warranty excludes uses not in compliance with specific applications and installation procedures set forth in this document. Warranty claims must be made by Purchaser in writing within ninety (90) days of receipt of the Products.

All warranty obligations of TSN shall be limited, at the sole discretion of TSN, to repair or replace the defective product(s). These remedies shall constitute TSN's sole obligation and sole remedy of purchaser under this warranty. In no event will TSN be responsible for incidental, consequential, indirect, exemplary, incidental, special, consequential, or punitive damages, or other losses or damages however caused, including, but not limited to, installation costs, lost revenue or lost profits. TSN's liability for damages shall in no event exceed the applicable portion of the purchase price for defective product(s).

Product defects that arise from acts of God, accidents, misuse, misapplication, improper installation, storage damage, negligence, or modification to product(s) or its components are specifically excluded from this warranty. Product defects that arise from Purchaser providing incorrect information to TSN, including but not limited to incorrect specifications such as incorrect dimensions, designs and/or loads, are also specifically excluded from this warranty. TSN does not authorize any person or party to assume or create for it any other obligation or liability in connection with Products except as set forth herein.

This Warranty is expressly in lieu of all other warranties, expressed or implied, including any warranties of merchantability or fitness for a particular purpose, all such other warranties being hereby expressly excluded.

## Patented Technology

VertiClip®, VertiTrack®, BridgeClip®, BridgeBar®, BuckleBridge®, StiffClip®, DriftClip®, DriftTrak®, DriftCorner®, GripClip®, JamStud®, MidWall®, StiffWall®, SigmaStud®, CircleTrak®, PrimeWall™, NotchTrak®, and BackIt® are trademarked products, and are patented or patent-pending technologies of TSN. Patent numbers are: #5,904,023; #5,467,566; #5,906,080; #6,701,689; and #6,892,504. Numerous TSN design configurations are patented and/or patent pending and are protected under US and International patent laws.

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