

# ENGINEERING

Every Calhoun structure is supported with over two decades of engineering excellence and attention to detail.





# 3D NONLINEAR ANALYSIS

**WHY CALHOUN? CALHOUN IS THE ONLY MANUFACTURER IN THE INDUSTRY WHO INCLUDES THE NEGATIVE EFFECTS FABRIC PLACES ON THE STRENGTH AND DURABILITY OF THE BUILDING, AND THEN ENGINEER THE STRUCTURE TO ENSURE ALL SNOW, WIND, AND SEISMIC CONDITIONS ARE EXCEEDED.**

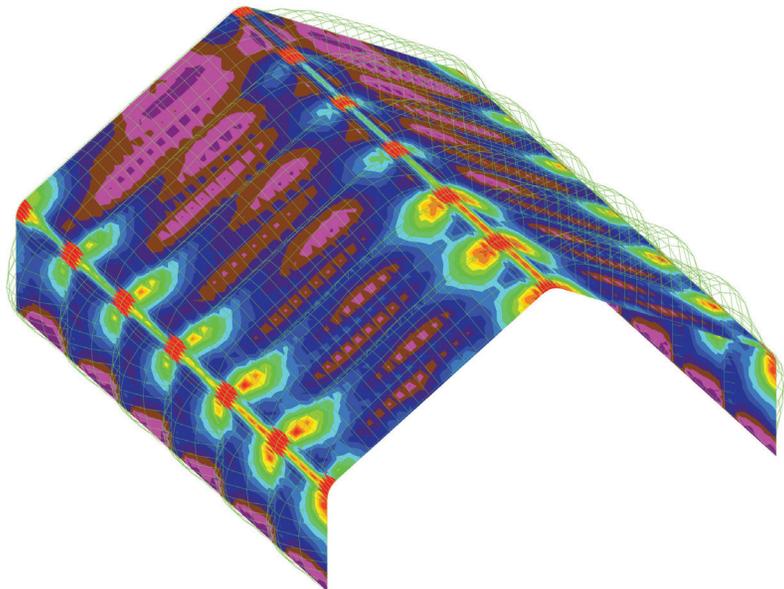
The industry standards for the engineering of fabric structures involve analysis that only approximates the load placed on the structure. This analysis results in a “best guess” as to how much force will be applied to the structure that will result in a non-accurate prediction that can lead to structural failure. Calhoun goes the extra mile to ensure that every structure installed is engineered to the highest possible standards, ensuring our customers have a safe, reliable and long ‘standing’ building.

## 3D NONLINEAR ANALYSIS

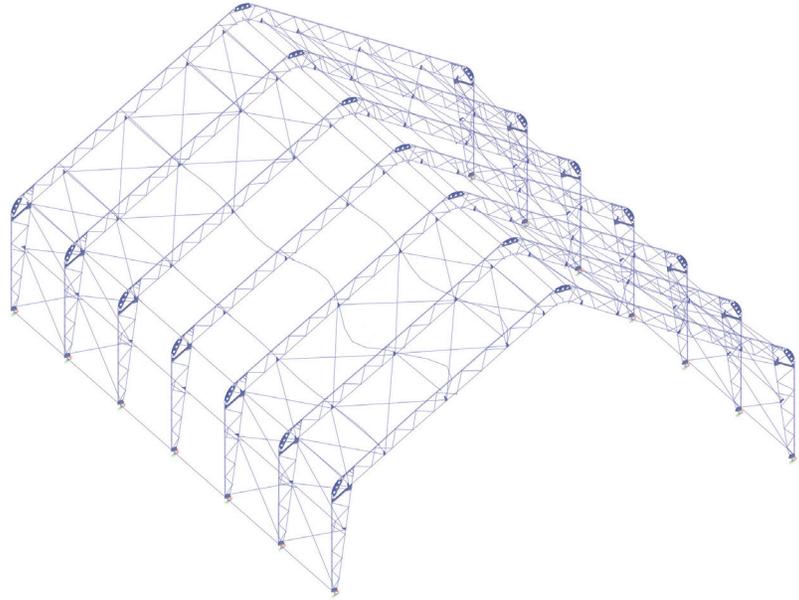
All Calhoun buildings are engineered using a site-specific 3D Non-Linear Finite Element Analysis which considers the snow, rain, wind, and seismic conditions at the building location. This technique allows Calhoun to deliver the strongest building for the customer’s location.

Calhoun also delivers detailed site-specific foundation reactions to allow the foundation to be engineered to further optimize the customer’s installation. This process provides for a detailed and precise assessment of reaction loads that will in turn allow for an optimized foundation design.

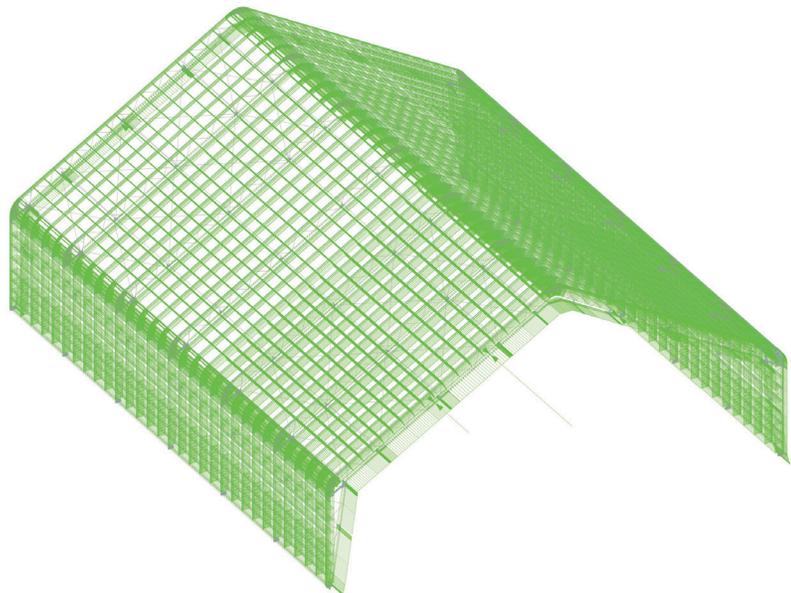
FABRIC STRESSES AND SCALED DISPLACEMENT



LOWEST MODE  
BUCKLED SHAPE  
FOR USE IN  
STABILITY CHECKS



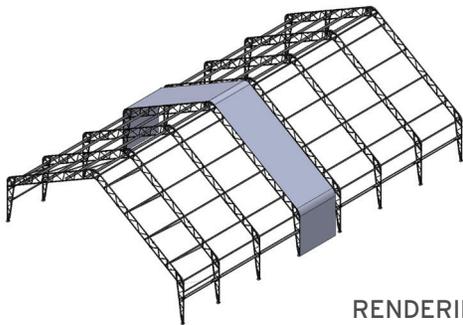
ENVELOPE LOADING  
D+CL+WIND  
PARALLEL+IP  
CONDITION



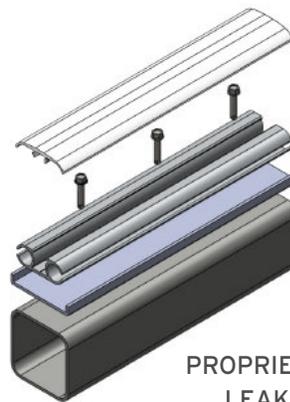
# **KEDER PANEL SYSTEM**

**WHY CALHOUN? WE USE A KEDER PANEL SYSTEM FOR ALL OF OUR BUILDINGS GREATER THAN 60' BECAUSE THE BAG COVER SYSTEM ON A BUILDING THAT SIZE SIMPLY DOESN'T LAST.**

The individual Keder Panel System is a custom made aluminum extrusion, mounted at each truss section on the top side of the top cord. This helps to create a continuous connection between fabric & frame.



RENDERING OF A  
KEDER PANEL APPLICATION



PROPRIETARY TRIPLE  
LEAK PROTECTION

## KEDER PANEL SYSTEM

With the Keder Panel System, the fabric panels are made to the exact bay spacing. The fabric Keder panel is secured through the aluminum extrusion and tensioned at both ends. This system ensures the fabric will not touch the frame of the structure, helping to create a quieter environment with no risk of wear points on the cover. This system is standard on all Calhoun buildings over 60' wide.

## FIRE RESISTANT

Calhoun's steel frame construction is non-combustible. The fabric membrane will melt when exposed to fire and will ensure any fire does not spread. With our Keder Panel System, any areas of the building exposed to a fire can be re-covered at minimum.

## PROPRIETARY TRIPLE LEAK PROTECTION

This proprietary system provides three layers of protection to reduce corrosion and prevent snow, ice or water from entering the gasket or building. The system includes a seal that acts as a barrier between the aluminum and steel to reduce the chance of corrosion between the two metals. In addition, it also provides a third layer of protection to ensure no water enters the building. Calhoun is the only company that offers this level of detail and protection.

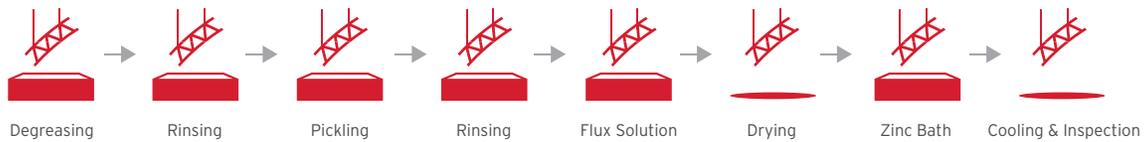
# **HOT DIP GALVANIZATION**

**WHY CALHOUN?** WE WERE THE FIRST IN THE INDUSTRY TO USE THE HOT DIP GALVANIZING PROCESS, DATING BACK TO 2005 AS A STANDARD TO ENSURE THE LONGEVITY AND STABILITY OF OUR BUILDINGS.

The Hot Dip Galvanizing process means that Calhoun structures last longer. Studies show that next to stainless steel, hot dip galvanizing (HDG) is the best protection against rust and weathering.

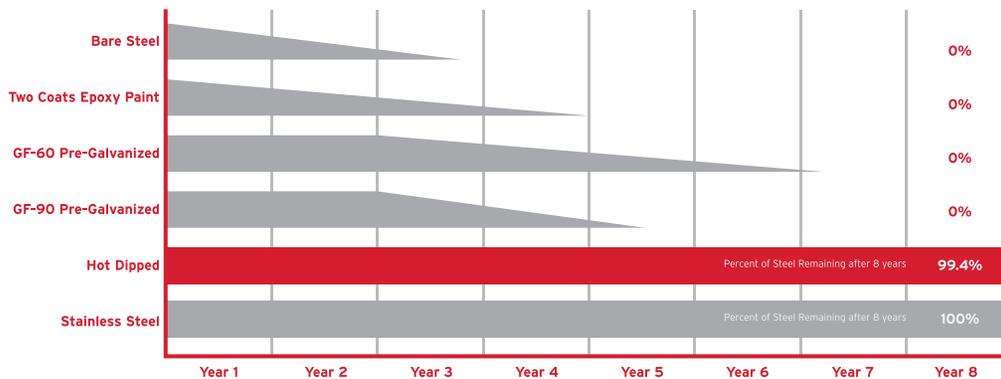
## HERE'S HOW IT WORKS

The hot dip galvanizing process makes our trusses strong and more reliable, while creating a smooth surface that won't snag or tear the cover.



## CORROSION COMPARISON

This chart is the result of an eight year test done in highly corrosive swine manure.



Steel plates were attached to wood and submersed in swine manure. The plates were weighed at intervals to determine the amount of corrosion.



## CC TRUSSES BEING HOT DIPPED GALVANIZED

### HOT DIP GALVANIZATION STANDARDS

Every Calhoun Super Structure is galvanized according to long-established, well accepted and approved standards of ASTM, the Canadian Standards Association (CSA), and the American Association of State Highway and Transportation Officials (AASHTO). These standards cover everything from minimum required coating thickness for various categories of galvanized items to the composition of the zinc metal used in the process.

#### HOT DIP GALVANIZED (HDG)

- Galvanization completed after fabrication.
- 3.9mils of zinc.
- Coats all surfaces including both the unseen inside surfaces and the outside surfaces.
- 3600psi after metallurgical bond.

### HOT DIP GALVANIZATION VS. INLINE COMPARISON

Hot Dip Galvanization (HDG) is 4x the protection and covers all of the weld unlike the inline galvanization. Inline is not covered on the inside, whereas HDG coats on the inside. The chart below shows a more in depth comparison.

#### INLINE GALVANIZED

- Galvanization completed before fabrication.
- 0.9mils of zinc.
- Interior weld locations are exposed leaving raw steel with no corrosion protection.
- 300-500psi after metallurgical bond.