May 2024 – Load Tables Blog/BE-Tyler Truss

GET A LOAD OF THIS! *How 'bout them Load Tables…*

If you work in event production, structure installations, venue management, rigging and other such industries where safety is paramount, you know about load tables. So as not to chew too big a bite of safety overall, let us talk about live events and truss load tables.

Live event production 'for concerts' to be more specific. An industry where theatrical aluminum truss, the backbone of live entertainment, is used to suspend light fixtures, speakers, LED walls and scenery. 'Rigs' that are supported by vertical towers or motor-hoisted over the heads of entertainers as well as their audiences.

You get the picture immediately. The truss, fixtures, LED walls, speakers, scenery…they are HEAVY. Especially when you have the entirety of these show elements all in the air…at once! Thousands of pounds, all over non-suspecting fans. Yes, safety is #1. And do not forget, there are engineering standards for indoor and outdoor setups.

Dealing with heavy loads indoors is one thing. It is another outdoors when you are dealing with the potential of storms, high winds, uneven surfaces, and more.

Cut to the chase you say?

Tyler Truss load tables are always shown as 'Repetitive Use.'

The 'Repetitive Use' calculation, not included on all manufacturers' load tables, is 85% of the 'Single Use' calculation. Obviously, this is critical when comparing truss brands/models, or spec'ing a show.

SEE ANSI 1.2 -2021 3.2.4

Entities that have a vested interest in safety include OSHA (Occupational Safety and Health Administration), ANSI (American National Standards Institute), city and county safety standards and regulations, venue rules and regs, rigging companies, manufacturer guidelines, and manufacturing guidelines including 'load tables'…provided by third-party engineering firms (e.g. Clark Reder).

This is where we stay 'grounded' and concentrate on one of the ingredients to a safe production… Theatrical Aluminum Truss Load Tables.

Tyler Truss 20.5x20.5x120 T-MAX Truss Bolted Load Capacity Table (Repetitive Use)

TRUSS SPAN	UNIFORMLY DISTRIBUTED LOAD		CENTER POINT LOAD		THIRD POINT LOAD		QUARTER POINT LOAD		FIFTH POINT LOAD	
	LOAD (pfl)	DEFL. (in)	LOAD (lbs)	DEFL. (in)	LOAD (lbs)	DEFL. (in)	LOAD (lbs)	DEFL. (in)	LOAD (lbs)	DEFL. (in)
10'	770	0.050	7,364	0.070	3,850	0.070	2,567	0.060	1,925	0.060
20'	362	0.360	3,622	0.290	2,716	0.370	1,811	0.350	1,509	0.360
30'	157	0.820	2,348	0.670	1,761	0.840	1,174	0.780	978	0.800
40'	85	1.460	1,690	1.210	1,268	1.510	854	1.410	704	1.470
50'	51	2.300	1,280	1.920	960	2.370	640	2.220	533	2.320
60'	33	3.350	993	2.840	745	3.440	497	3.240	414	3.370

Five (5) Main Sections/Load Tables

- Uniformly Distributed Load (UDL) - a load evenly spread over the entire length of a truss or tower. Examples of a UDL would be a curtain or video wall.
- Center Point Load - A concentrated load applied at the midspan of a truss or tower.
- Third Point Load - 2 max allowable point loads evenly spaced at each1/3 point along a span.
- Quarter Point Load - 3 max allowable point loads evenly spaced at each 1/4 point along a span.
- Fifth Point Load - 4 max allowable point loads evenly spaced at each 5th point along a span.

Above is a sample Tyler Truss load table for its new (2024), stronger 20.5x20.5 bolting truss, **Tyler T-Max**. You will note at the top, far right it states, 'Repetitive Use.' Not all manufacturer tables show this. **Tyler Truss load tables always specify Repetitive Use.**

This is extremely important to know when calculating your set up. And when comparing truss/brands prior to making an important purchasing decision!

So...if Repetitive Use is not indicated, what could the load table be depicting?

It could be 'Single Use.' Here is the difference...

Single Use: For a permanent set up, the assembly and installation of modules or assemblies specifically <u>intended to either be permanently left in place or scrapped after being dismantled.</u>

SEE ANSI 1.2 -2021 3.2.4

Repetitive Use: Used multiple times...a module regularly assembled in various configurations, with loads applied differently, supported at different joints, or transported to different locations.

- (From ANSI) **Design of Truss or Tower Modules for Repetitive Use**: *The design strength determined in accordance with the standards cited herein shall be multiplied by a factor of 0.85 <u>when the components will be subjected to repetitive use</u>. This reduced design strength shall be greater than or equal to the maximum demand on the module from the intended loading conditions.*

The 'Repetitive Use' calculation is 85% of the 'Single Use' calculation.
That is a 15% difference in load capacity!

It boils down to how accurate the load table figures are and critical to how much weight is truly safe for a "Live Load" (see definition below).

If this has been overly repetitive, it was intentional. Have a great show!

OTHER TERMS TO KNOW…

Dead Load: Weight of the structural component (truss) and any permanently attached material supported by the structure. The **self-weight** or dead load of truss is generally considered in engineering calculations, and generally, does not have to be included in the calculation of live loads. If included, the user does not need to subtract the weight of the truss from the provided loads.

Live Load: The additional weight placed on or temporarily attached to the structure.

Dynamic Loading: Forces caused by the acceleration or deceleration of an object.

Dynamic Load includes shock loads, wind, seismic, snow, and ice loads not included in tables.

Working Load is the expected dead + live load.

Ultimate Load is the load required to collapse the structure.

All point loads shall occur at a panel point on the truss.

About OSHA and ANSI

OSHA is a federal government agency that regulates and enforces health standards and workplace safety regulations in companies throughout the U.S. Its work is mandated by the Occupational Safety & Health Act of 1970, also known as the OSH Act. OSHA regulations are U.S. law, and you must follow them to avoid penalties.

ANSI, on the other hand, is a non-profit organization focused on coordinating and approving voluntary national consensus standards in the U.S. This organization works directly on the front lines to find the best ways to develop standards that improve workplace safety. Its team stays up to date with new technology and works hand-in-hand with manufacturers. It also partners with both insurers and the industry to push safety compliance.

ANSI is not a government agency. It is a voluntary consensus standards organization. ANSI represents industry best practices. In some cases, companies do not have to legally comply with its standards and compliance is not compulsory, however, in other cases they are.

In fact, OSHA sometimes adopts or refers to ANSI standards in its own codes. If a law includes a reference to an ANSI standard, that standard is now considered law. The non-profit's work may also be used to write new legislation. If the federal or state government uses the language from ANSI standards to create a law, the government can now legally enforce the standards.

The two organizations also work together to improve standards and legislation. ANSI provides expert assistance to OSHA's standards advisory committees to ensure new laws reflect reality. In return, OSHA lets ANSI know about any activities related to hearings, proposals, and final rulings for the development of new standards.