

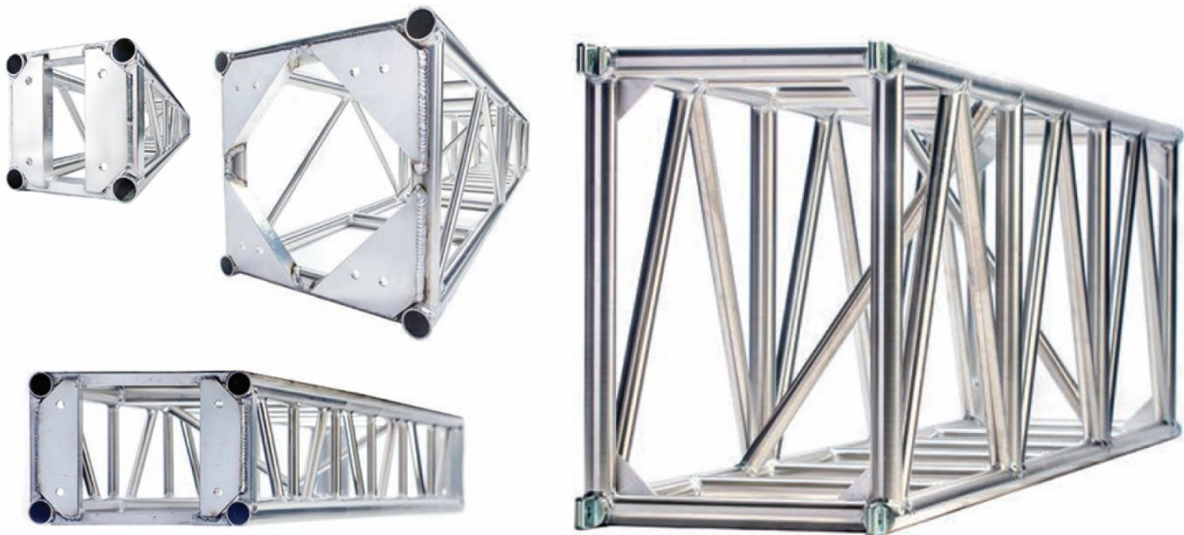


TOMCAT

Trusses

User manual

Part 1: General instructions



Original instructions

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Manufacturer:

TOMCAT USA Inc.

5427 N. National Dr.

Knoxville, TN 37914

U.S.A

Tel. 1 (865) 219-3700

sales@tomcatusa.com

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If you have a warranty claim, malfunction or spare part inquiry, contact your point of sale or the manufacturer.

If you have comments or improvement ideas for this document, please contact us by using the e-mail address found on the back cover of the document. All comments and ideas will be carefully considered in the future development of the product or this document.

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Change history

Issue	Date	Changes
1	February 2020	First issue.
2	June 2024	Various corrections + additions

1 Introduction

This manual is intended for truss owners, providers, skilled riggers and any person who has been trained in working safely with trusses.

This manual is Part 1 of the User Manual. The User Manual consists of the following parts:

- *Part 1: General instructions*
- *Part 2: Product-specific instructions*

This manual must be read in conjunction with *Part 2: Product-specific instructions* of the User Manual.

If there are discrepancies between *Part 1* and *Part 2*, the information given in *Part 2* is the information that applies to the product and overrides the information given in *Part 1*.

This manual assumes that you have been trained or work under the control of a competent or qualified person who has been trained in safety and assembly.

1.1 About this product

TOMCAT trusses are structural modules designed to be repeatedly assembled and disassembled to carry loads in temporary or permanent installations. Depending on the application, TOMCAT trusses can be referred to as lifting accessories or construction products. For information on the related standards, see Chapter 1.5.

We have paid special attention to product safety when designing the product.

The manufacturer is not liable for indirect consequential damage and financial loss. The manufacturer shall not be liable for any changes made to the product nor for any damage resulting from such changes.

1.2 Related information

For more information on the product, see www.tomcatglobal.com/products.

1.3 About this manual

Before working with the product, read this manual carefully and pay attention to the information provided. Use this manual to familiarize yourself with the product, its proper use and safety regulations.

1.3.1 Safety conventions



Indicates a hazardous situation, which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.



Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.



Indicates information considered important but not hazard-related.



1.4 Terminology

Trusses and truss modules are hereinafter referred to by the term "truss".

Term	Definition
abrasion	Loss of material due to wear.
bent member	A component or assembly that has permanent deviation from the intended center line.
bolted connection	A type of connection that has the following parts: camplate, 5/8" grade 8 steel bolt, washers, 5/8" grade 8 steel nut. See Figure 1.
camplate	The plate at the end of the truss, including bolt holes. Figure 1
clevis pin	A pin used with a spigoted connection. See Figure 3.
competent person	A person who is capable of identifying existing and predictable hazards in the workplace and who is authorized to take prompt corrective measures to eliminate them.
components	Parts of a whole.
connecting hardware	Connecting components such as clevis pins, bolts, nuts, washers and R-clips.
connection	Used to connect two trusses together. There are two kinds of connections: bolted connection and spigoted connection. See Figure 1 and Figure 2.
connector	A part of a connection.
crack	A crevice type of discontinuity in a material.
diagonal	An element of a truss system that is not at a 90-degree angle to the main chords.
end brace	An element of a truss system that is located at the end of the truss system, directly after the connector, at a 90-degree angle to the main chords.
female spigot connector	A part of a spigoted connection. See Figure 2.
half coupler	A device for supporting objects or fastening them together.
identification sticker	A sticker on the product on which several pieces of information about the product can be found.
internal diagonal	An element of a rectangular or square truss that connects diagonally the main chords at a 90-degree angle to the main chords.
main chord	An element of a truss that carries the forces associated with bending moments, axial forces, or combination of them.
male spigot connector	A part of a spigoted connection. See Figure 2.
member	See "truss member".
node point	A location where the center line of the main chord intersects with the center line of the diagonals or end braces.
ovalization	Deformation of a circular pipe cross-section into an oval, measurable by the deviation of two outer diameters measured at a 90-degree angle to each other.
pin hole	A hole in the connector that accommodates a conical or straight truss pin.
plated connection	A type of connection used for connecting trusses together. See Figure 1.
qualified person	A person who, by possession of a recognized degree or certificate of professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve problems relating to the subject matter or work. A qualified person supervises the competent persons. See "competent person".

R-clip	A clip used for securing a truss pin or clevis pin, for example. See Figure 2 and Figure 3
repetitive use	Assembling and disassembling the same modules or assemblies on multiple occasions.
shall	Indicates that a rule is mandatory and must be followed.
should	Indicates that a rule is a recommendation, the advisability of which depends on the facts and conditions in each situation.
single-span girder	A single truss module or a composition of several connected truss modules, supported at the both ends of the span.
spigoted connection	Used for connecting trusses. See Figure 2.
straight truss pin	See clevis pin.
truss member	A part of the truss module.
truss structure	An assembly made of truss modules.
truss module	Lattice structure intended to be used on its own or in combination with other modules.
user	A person or a company who assembles or uses modules or systems.

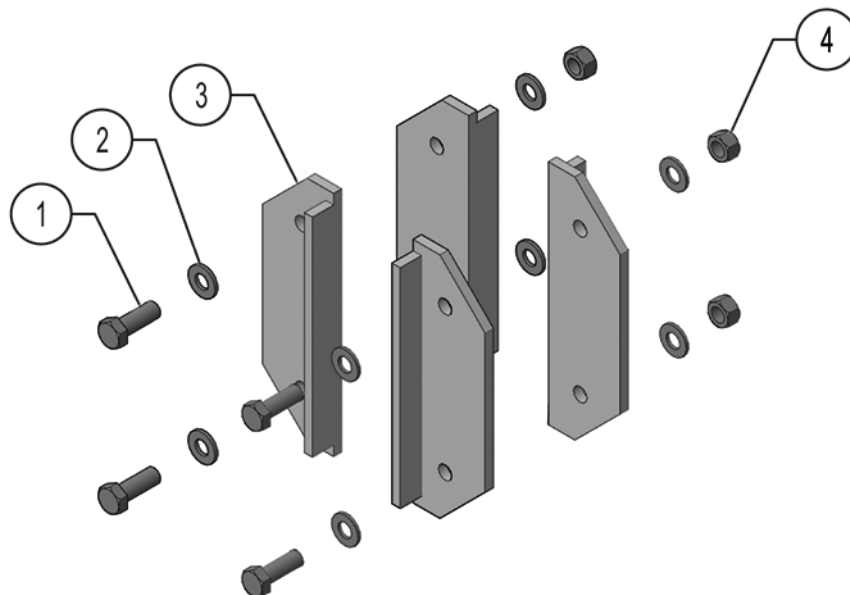


Figure 1: Bolted connection

- 1 5/8" grade 8 steel bolt
- 2 Steel washer
- 3 Camplate
- 4 5/8" grade 8 steel nut

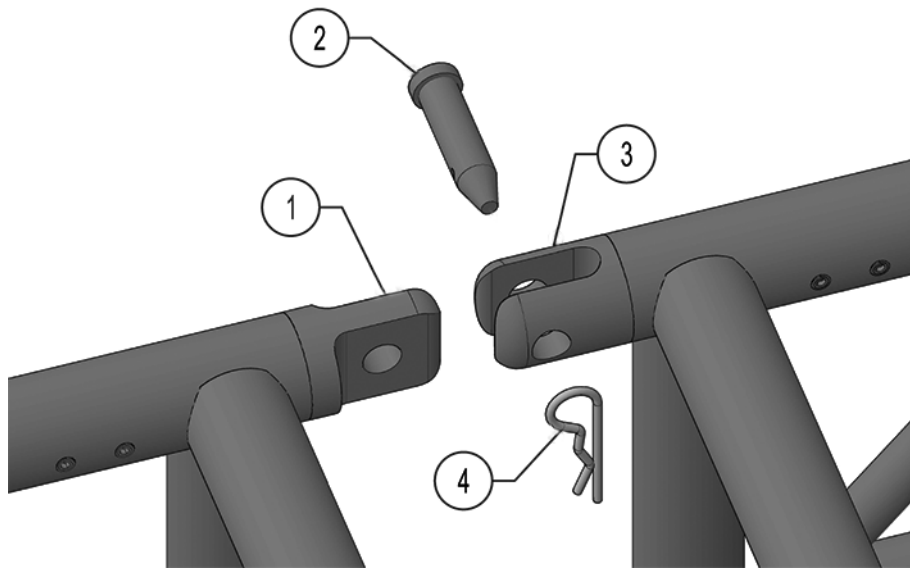


Figure 2: Spigoted connection

- 1 Male spigot connector
- 2 Clevis pin
- 3 Female spigot connector
- 4 R-clip

1.5 Standards

NOTICE

It is the sole responsibility of the owner or provider to check with the local authorities if the legislation used by TOMCAT is acceptable in the country of use.

For manufacturing, the following standards are considered:

- ANSI E1.2 – 2012 Entertainment Technology – Design, Manufacture and Use of Aluminum Trusses and Towers.
- 2015 International Building Code
- Aluminum Design Manual, 2015 ed.
- American Institute of Steel Construction, Steel Construction Manual 14th Edition
- American Society of Civil Engineers 7-10 (ASCE 7-10) "Minimum Design Loads for Buildings and Other Structures"
- Regional Specific Building Codes
- American Welding Society AWS - Structural Welding Code
- ANSI E1.43 - 2016 "Entertainment Technology - Performer Flying Systems"

2 Safety

NOTICE

Read these safety texts carefully before working with the product.

NOTICE

Make sure manuals are available at all times for all users and employees.

WARNING

Do not mix structural data (for example, load table information) without knowing the respective safety principles or design concepts.

WARNING

Be cautious when using data of structures based on Load and Resistance Factor Design (LRFD) standards, such as the International Building Code, Entertainment Services and Technology Association (ESTA) or data based on Allowable Stress Design (ASD). A structural engineer can provide help.

Trusses and structures from assembled trusses shall always be checked for their structural stability and strength by a structural engineer. The provided technical specifications should never be exceeded.

WARNING

Do not use damaged or malfunctioning parts.

WARNING

Mark any damaged or worn material clearly and discard the material immediately.

2.1 Electrical safety

2.1.1 Electrical potential bonding

WARNING

ELECTRICAL HAZARD

Truss structures that are in contact with electrical equipment might develop dangerous touch voltages in the event of an electrical fault. Before energizing any of the electrical equipment, the user must ensure that the truss structure is properly grounded. This applies to all modules made of electroconductive material that have equipment placed on or attached to them, or across wire and cable runs that, if damaged, could make electrical contact with metal parts.

It is extremely important to ground the truss structures because the audience and installers very often come into direct contact with the truss structures when the suspended fixtures are electrically charged.



2.2 Personal protection equipment

For health and safety reasons, people moving, assembling, disassembling, maintaining or transporting the product should wear adequate Personal Protection Equipment such as, but not limited to, gloves, sound protection, hard hats and safety shoes.

All people working with trusses should be instructed and informed about the correct usage and possible dangers before use.



PERSONAL INJURY HAZARD

Always wear hard hats, safety shoes, sound protection, and protective gloves when moving, assembling, disassembling, maintaining or transporting the product.



PERSONAL INJURY HAZARD

Follow your local noise level regulations when assembling and disassembling the product.



PERSONAL INJURY HAZARD

Follow your local regulations of the maximum allowed weight per person when carrying or moving the product.

3 Limitations of use

The truss shall always be used within the limits of the structural report and the declarations provided.

All our trusses are calculated according to the ANSI E 1.2-2012 and 2012 International Building Code standards.

TOMCAT trusses described in this manual are not specifically designed for lifting people. Adequate load reduction and safety precautions, according to local legislation, must be considered when people are lifted.

Use the product only for its prescribed purpose. Any use other than that mentioned is considered to be a case of misuse. The user or operator and not the manufacturer shall be liable for any damage or injury resulting from such cases of misuse.

3.1 Load charts

All truss loading calculations and certifications are based on the following:

- The self-weight is already taken into account
- Static loads only
- Single-span girders (all other structures made of trusses need dedicated structural reports)
- Loads applied in the node points
- Spans can be assembled of several modules
- The interaction of shear force and bending moment at the connector is considered for spigoted truss

3.2 Load reduction factor for repetitive use

To meet the BS 7905-2, ANSI E1.2-2006 and EN 17115 standards for truss modules in repetitive use, all loadings shall or should (depends on the standard) be multiplied by 0.85.

The truss calculations consider only static or virtual-static loads and no fatigue loads due to a high number of load cycles.

3.3 Compatibility with other products

Some products within our range fit with those of other brands. However, trusses can differ considerably depending on their design, layout and manufacture (for example, material properties, alloy, diameter, thickness or layout of the bracing or system tolerances).

We provide comprehensive technical support and structural data for all our truss systems. The structural integrity of an assembled structure of different brands and the legal compliance is the sole responsibility of the user. Their combined use must always be certified by a structural engineer case by case. TOMCAT cannot accept responsibility for products manufactured by third parties. Our design and quality assurance certifications are based on the latest American standards including ANSI E1.2, The Aluminum Design Manual and the American Welding Society, and they are at least equal to other truss manufacturer specifications within the EU and US markets. The only exception to this rule would be for James Thomas Engineering (JTE) products. Compatible JTE products and TOMCAT products can be used together. The performance should be defaulted to the lowest load table between the two products.

3.4 Environmental influences

3.4.1 Temperature

Based on Aluminum Design Manual 2015, trusses can utilize full loading capacity in environmental conditions varying from -4°F up to 200°F (from -20°C up to +93°C).

However, take special care if trusses are used in temperatures below 32°F (0°C).

The open chord ends and capillary action of pin holes on some of our truss models can cause water intrusion inside the truss chords and diagonals.

In temperatures below 32°F (0°C), the captive water may freeze and cause damage to the truss members

To avoid this situation, TOMCAT can provide the same trusses with end caps, sealed coil pin openings and drainage holes.

3.4.2 Aggressive environments

Take special care when trusses are used in aggressive environments or in the near vicinity. The aluminium alloys used in trusses might not be suitable for this environment.

Avoid direct contact with concrete by using a sealant or rubber pad.

The alloy used has good properties in a saltwater environment, however, oxidation can occur on the surface. Clean regularly with fresh water.

The material used for the connectors is especially vulnerable to saltwater. Utilize stainless steel connectors or coat or treat it with a sealant in such a way that no saltwater particles can come in contact with the material.



4 Transport, handling and storage

WARNING

PERSONAL INJURY HAZARD

Always wear hard hats, safety shoes, sound protection, and protective gloves when moving, assembling, disassembling, maintaining or transporting the product.

CAUTION

PERSONAL INJURY HAZARD

Vertical transportation or storage of the product can be hazardous for reasons of falling.

Handle the product with care. Do not drop it or drag it around. Do not throw truss modules on top of each other. Prevent damage from sharp edges such as the forks of a forklift.

Dedicated dollies can be a highly effective means for transportation and storage, while providing large truss modules or sections with some extra protection.

Make sure the product cannot move or shake during transport. The abrasive motion of moving or shaking can lead to severe damage.

5 Identification

TOMCAT products can be recognized by identification stickers.

CAUTION

Make sure only TOMCAT original components are used. For more information, contact your distributor or the manufacturer.

NOTICE

There is always an identification sticker delivered with the product. Replace any missing identification stickers. Contact the manufacturer or its representative for information on the correct procedure.

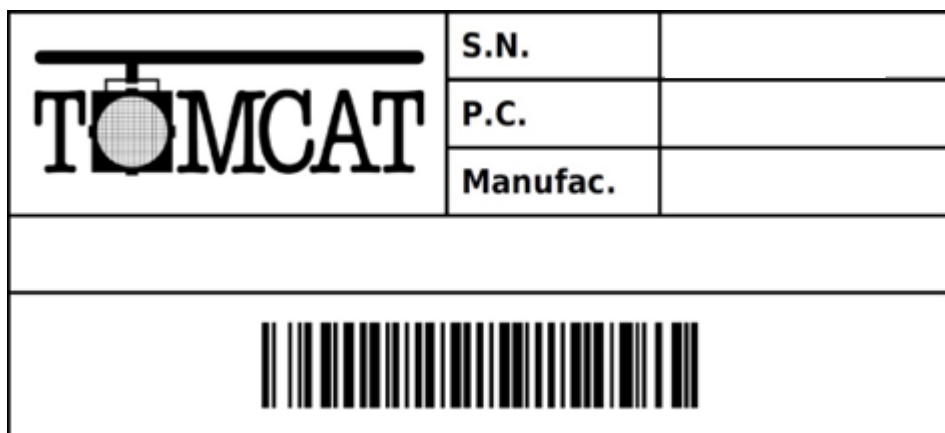


Figure 3: Example of an identification sticker (without product info)

6 Technical specifications

For information on technical specifications, see *Part 2: Product-specific instructions*.

7 Load capacity

For information on load capacity, see *Part 2: Product-specific instructions*.

8 Approved accessories

For a complete overview of approved accessories, see our brochures or www.tomcatglobal.com.

WARNING

By using excessive force when tightening accessories such as lamp hooks or half couplers, you may cause damage to the truss chords.

CAUTION

Pay special attention when using lamp hooks or half couplers. Their inside radius may not meet the tube they need to be attached to. This can lead to severe damage.

NOTICE

You should never allow accessories to damage other products.

9 Coatings and surface treatments

Coatings and surface finishes should only be applied after consulting with the coating or finish manufacturer or other party qualified to evaluate the possible effects of the coating or surface finish on the structural properties and load bearing capabilities of the truss.

Powder coating is allowed with max. 356°F (180°C) for up to 20 minutes. If it is necessary to renew the powder coating, coordinate the process with TOMCAT.

Records should be kept detailing the application of any coating or surface finish, with particular attention to processes requiring the application of heat.

Chemical removal of coatings and surface finishes shall be carried out only after consulting with the chemical manufacturer to ensure that the chemical will not affect the mechanical properties of the aluminium.

Abrasive blasting should not be used, because it can cause loss of material.



10 Slinging methods

The load capacities listed in the load tables refer to truss that is loaded and suspended or supported under optimum conditions. Since the method of attachment can generate local stress that reduces the global strength, it is important to use the correct slinging method, especially with high payloads.

It is therefore recommended that you pay attention to the following points when slinging:

- Make sure the attachment point is in the node of the diagonal or end brace with the main chord or directly next to it.
- Make sure the hanging point is above the center of gravity of the truss.
- Minimize the horizontal compression of the main chords by choosing the correct slinging positions and avoiding flat bridle angles.

WARNING

Apply slinging solely to the main chords, not to the connectors, diagonals or internal diagonals.

WARNING

Apply slinging to node points, aside end braces or aside horizontal cross braces.

NOTICE

Slinging equipment shall be made from non-abrasive and fire-retardant materials.

Use slinging devices that have a soft cover.

Direct contact between a steel wire rope and the truss chord should be avoided because of the abrasive surface of the steel wire rope.

For stability reasons, wrap at least 2 main chords.

Trusses can be suspended from either the top or bottom chords. The best method depends on the application.

NOTICE

Suspending and supporting have the same effect on the truss.

If the truss is not supported or loaded in the node point, the main chords will be subjected to an additional local bending moment. This effect should be considered in the structural analysis and could lead to reduction of the load capacity.

For a simple supported span at both ends, this might be less of a problem as the bending moment at the ends is almost zero.

In a multiple supported truss, the main chords at the mid-span supports are subjected to a bending moment and shear at the same time.

For optimum performance, suspensions should be attached to the node points. If not, the load capacity of the truss might be substantially reduced. Slinging to all main chords does not change this. The correct load can only be determined by studying each load case individually. This should be done by a structural engineer.

10.1 Recommended slinging methods

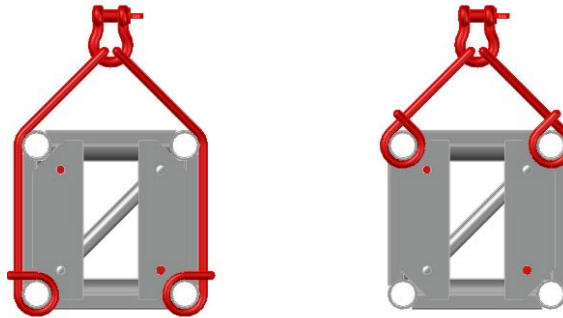


Figure 4: Slinging methods for TOMCAT Box trusses

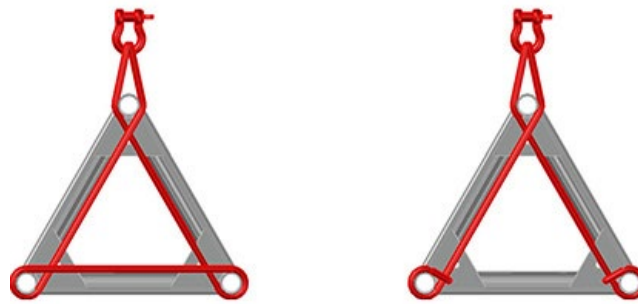


Figure 5: Slinging methods for TOMCAT triangle trusses

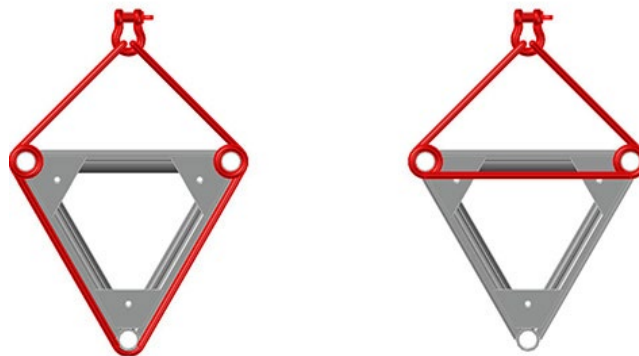


Figure 6: More slinging methods for TOMCAT triangle trusses

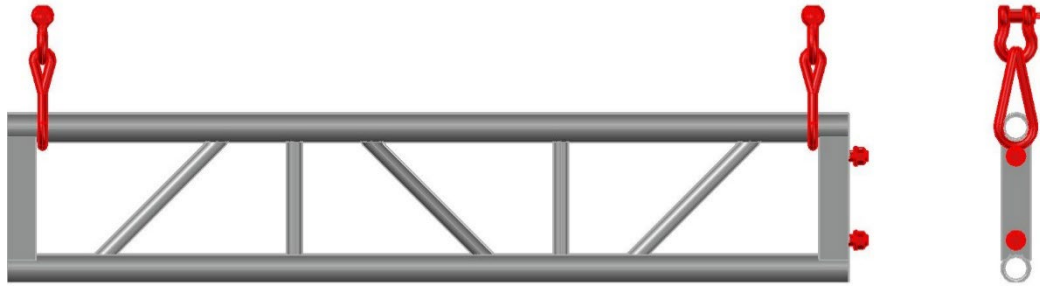


Figure 7: Example ladder truss pick-up

NOTE: Ladder truss pick-up should be rigged in a manner to prevent the truss from overturning under load. In other words, it is recommended that you rig the lift points from the top chords.

 **CAUTION**

Ladder trusses and two-chord trusses need very special attention when slinging. The top chord must be stabilized because of risk of lateral torsional buckling. Only load the bottom chord. Other types of loading need structural analysis before use.

11 Assembly and disassembly

11.1 Safety when assembling and disassembling

A competent person or sufficiently instructed personnel under the supervision of a competent person, should always assemble the product.

Before assembly, use, and disassembly, the competent person is responsible for, but not limited to:

- Carrying out all the instructions as described in this manual and in the specific instructions of the applicable truss product.
- Instructing the people doing the assembly and ensuring that all trusses and loads are suspended correctly.

You are strongly advised to show people carrying out the assembly or disassembly how to physically assemble and disassemble trusses, how to orientate connectors and which tools to use.

11.2 Required tools

- Torque wrench
- Truss hammer

11.3 Torque

Use a torque wrench to tighten all bolts and nuts under tension. When bolts are connected with threaded steel components, use the following torque setting:

- 80 ft-lbs.

11.4 Assembling a truss

1. Slide both truss modules towards each other.
2. For bolted connections, align the camplate holes. For spigoted connections, align the pin holes of the female and male spigot connectors. If the holes are not aligned, adjust the truss. Do not use excessive force.
3. Assembling the truss pin

when using a pin with an R-clip:

Insert the pin through the pin holes, preferably with a copper hammer. Tip: Place the pin in such a way that the hole for the R-clip is perpendicular to the length of the truss. This makes it easy for you to mount the R-clip.

Secure the pin with the R-clip.

4. Sling the truss as instructed in Chapter 10.
5. Check that all connections are made properly.
6. Attach loads as instructed in Chapter 11.5.
7. Lift the truss to working height and inspect all the connections. Correct if necessary.
8. Lift the truss to the required height. When lifting, avoid "bumping", as it will lead to increased forces in the truss and load.

11.5 Attaching a load

WARNING

Before applying loads, a competent person should check if all trusses are connected properly.

Make sure loads are equally divided over both bottom and top chords. Loading a truss on one side leads to internal torsional forces which are not considered in the loading data provided.

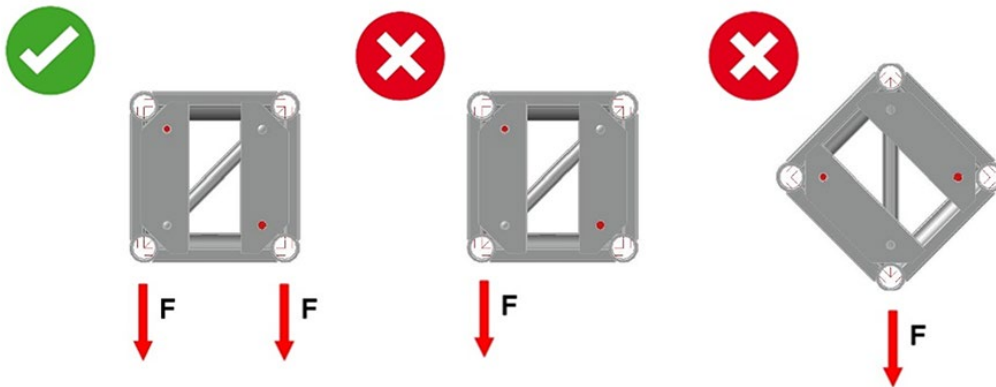


Figure 8: Attaching loads to a TOMCAT Box truss

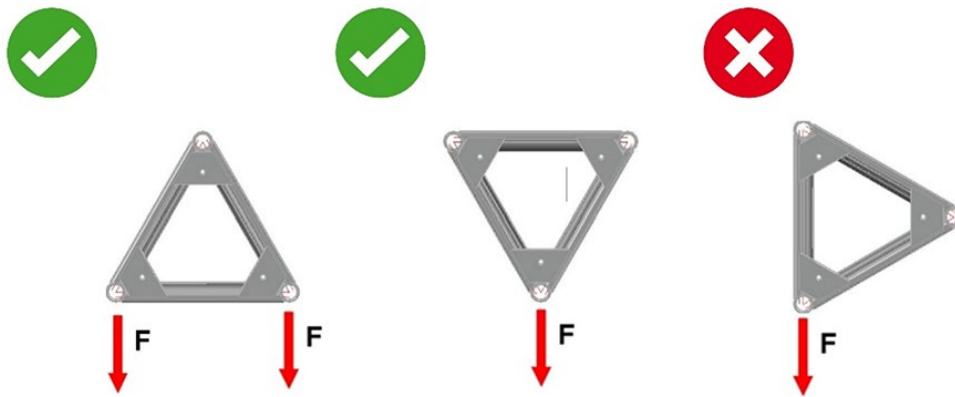


Figure 9: Attaching loads to a TOMCAT Triangle truss

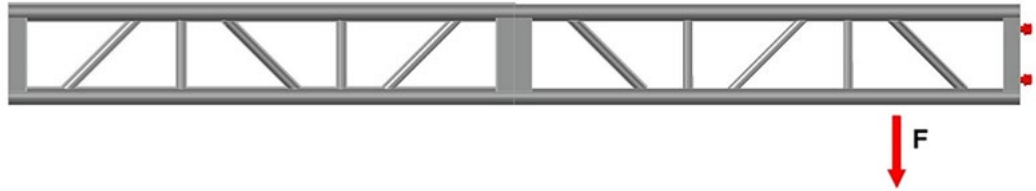
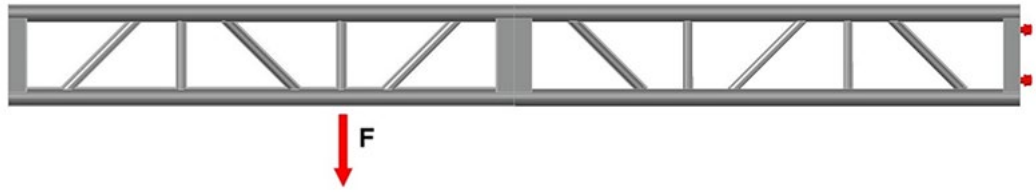


Figure 10: Attach the load as close to a node point as possible

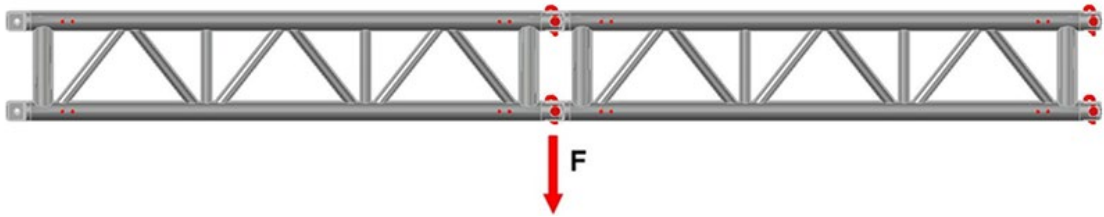
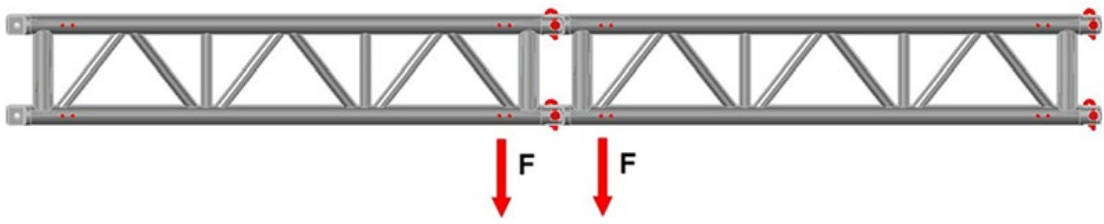
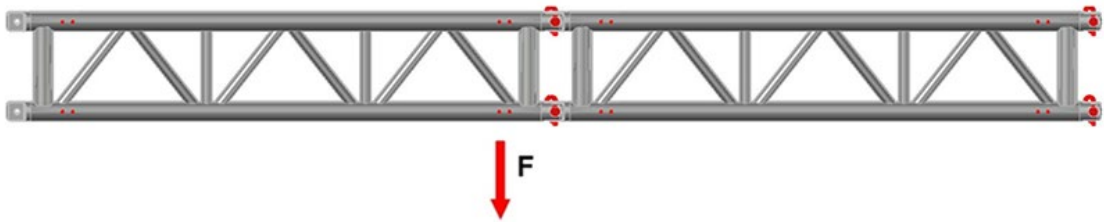


Figure 11: Attaching loads near the connector

NOTE: It may be possible to use some of denied methods, but only after consulting a structural engineer.



11.6 Disassembling a truss

1. Lower the truss to working height.
2. Detach the loads.
3. Inspect the truss for any damage. Mark the truss accordingly and discard it, if necessary.
4. Lower the truss to the floor level.
5. Disconnect the slings or lifting accessories.
6. Remove the truss pins /clevis pins.
7. Hit the pins firmly to remove them.
8. Inspect the components for damage. Mark the components accordingly and discard them, if necessary.

12 Maintenance

Although aluminium may not develop corrosion the way many steel alloys do, ambient influences can have a corrosive impact on aluminium. Take special care with trusses that are placed outdoors for an extended period of time, especially in areas with a high level of industrial pollution, near saltwater, near tram lines or near swimming pools. Trusses should be individually inspected before each use to find out if the expected pollution has had a corrosive effect.

Repairs should be carried out and warranted by either the manufacturer or a suitably qualified person approved by the manufacturer.

WARNING

Do not repair the product without first consulting the manufacturer.

Smooth the surface of coupling parts regularly. Use fine sandpaper or conventional abrasive materials.

Keep the coupling parts slightly lubricated with oil, silicone spray or similar lubrication. Lubricants should not be sticky, to avoid gathering dirt, dust or small debris.

Avoid painting the inner surface of the connector and pin holes. This has a negative effect on the fit.

Remove any kind of debris and dirt from truss and its components. Do not use any abrasive methods other than an abrasive cloth or sandpaper grain 240 or higher.

13 Inspection

Depending on local regulations, we recommend that either a qualified person or a certified body carries out a careful, documented inspection at least once a year or as often as required by the circumstances or the intensity of use.

WARNING

Perform the inspections as instructed in Chapter 14 to ensure the safe use of the product.

In case of an accident, misuse or malfunction, the product should be marked, discarded and inspected by a qualified person to establish its structural integrity for re-use. The product should be identified accordingly, and records of identification numbers and photos should be kept.

WARNING

Do not use damaged trusses, connectors or pins.

Responsibility and liability for the safe use of the product lies predominantly with the user.

For information on the discard criteria, see Chapter 14.



13.1 Inspection levels

13.1.1 Regular inspection

Depending on local regulations, we recommend that either a competent person or a certified body carries out a careful, documented inspection at least once a year or as often as required by the circumstances or the intensity of use.

13.1.2 Periodic inspections

A qualified person shall perform periodic visual inspections on behalf of the user in accordance with Chapter 14, and a record of the inspections shall be maintained.

13.2 Inspection frequency

13.2.1 Initial inspection

When first acquired, whether new or used, inspect the product as instructed in Chapter 14. Keep a record of the inspections and identification numbers.

13.2.2 Inspections after accident, incident or malfunction

If the truss modules were subjected to any accidents, inspect the modules as instructed in Chapter 14.

Examples of accidents, incidents or malfunctions are:

- Dropping a truss on the floor from a height
- Lifting a truss with pins missing in joints, which might cause overloading
- Subjecting a truss to shock loads
- Tightening a truss during lifting

13.2.3 Truss in regular and non-regular service

Perform regular inspections prior to every use, or, when not in use for a period of one month or more, and periodic inspections at least once a year.

13.2.4 Permanent installations (stationary)

Perform periodic inspections on all truss modules permanently installed in a stationary configuration. A qualified person shall determine the frequency of inspections based on the prevalent conditions.

13.2.5 Permanent installations (moving)

Perform periodic inspections on all truss modules permanently installed in a configuration where movement of the truss is an integral part of use. Periodic inspections shall be carried out every three months, or in accordance with an inspection routine established by a qualified person.

13.3 Records

The owner shall keep records of initial and periodic inspections for each truss, which should be signed and dated by the person carrying out the inspections.

An example for an inspection report can be found at the end of this user manual.

14 Discard criteria

All the discard criteria must be considered when doing the inspection.

In addition to the normal requirements related to use, professional assembly and disassembly, transportation and storage of the product, regular inspections are vital. Carefully inspect each individual module visually before each use, regardless of the respective field of use.

For information on the required frequency of inspections, see Chapter 13.2.

If any damage is noted during an inspection of the product that precludes further safe use, the product must be discarded and disposed of. In most cases, it is not enough to just identify the damage.

Disposal through the manufacturer, supplier or a metal recycling company is the only safe way of protecting others from risks associated by damaged material.

Due to fabrication, the truss can have some dimensional deviation from the theoretical dimensions provided. These deviations are within the manufacturer's standards.

14.1 Overview of discard criteria

Inspection	Failure symptoms							
	Bending	Twisting	Deformations that do not allow easy assembly	Corrosion	Scratches, indentations, signs of attrition	Holes	Ovalization	Distortion, constriction
Geometry								
Main chords	Breaks, cracks	Bending	Deformations that do not allow easy assembly	Corrosion	Scratches, indentations, signs of attrition	Holes	Ovalization	Distortion, constriction
Diagonals, end braces	Breaks, cracks	Missing	Bending	Corrosion	Scratches, indentations, signs of attrition	Holes	Ovalization	
Connectors	Cracks in welds	Deformations that do not allow easy assembly	Corrosion	Scratches, cuts, hammer strokes	Oval signs of wear in pin holes	Ovalization of pin holes due to overload		
Connecting hardware	Pressure area on pin or bolt	Bending	Deformation on R-clip hole	Reused self-locking nuts	Damages on smooth surface of pin	Mushroom heads	Corrosion	

14.2 General criteria

WARNING

If any part of the product shows significant visible damage or is suspected of containing a damaged module, visible or not, the product must be discarded and marked accordingly. A qualified person should assess the product.

WARNING

If in doubt when assessing individual damages, contact the manufacturer, supplier or a qualified person.

WARNING

Mark any damaged or worn material clearly and discard the material immediately.

Part	Failure symptoms
Truss	Welds which have cracks or other irregularities.
Truss	Excessive corrosion whereby the total cross-sectional area of the truss is reduced by more than 25% of the thickness or more than 10% of the cross-sectional area of the component.

14.3 Geometry of the truss

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded.

	Failure symptoms
Truss	The lasting deformation of the truss by twisting is more than 0.15° per meter of the truss length. Check the twisting with a digital leveller. The angular difference between the measurements at the both ends of the truss, divided by the length of the truss, shall not exceed 0.15° .
Truss	The lasting deformation of the truss by bending exceeds the following limits: Max. $\Delta = 0.12$ in (3 mm) if $L < 7.38$ ft (2250 mm) Max. $\Delta = L/750$ (length divided by 750) if $L > 7.38$ ft (2250 mm) See Figure 12.

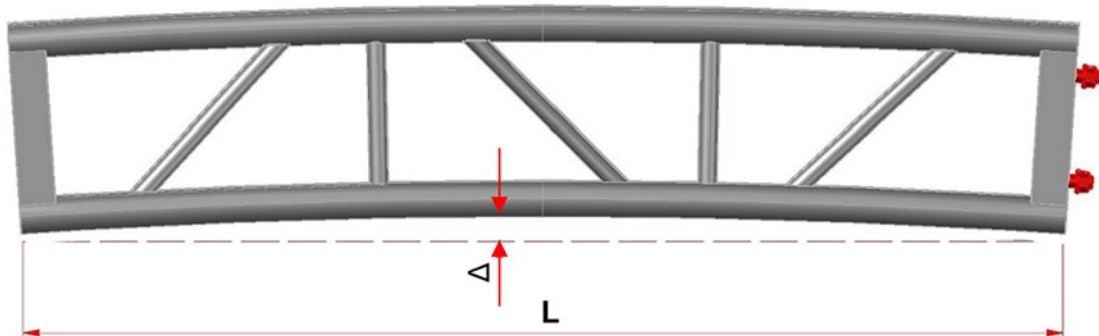


Figure 12: Limits for the lasting deformation of the truss by bending



14.4 Main chords

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded.

Part	Failure symptoms
Main chord	Breaks or cracks in the main chord.
Main chord	The main chord is bent more than 0.12 in (3 mm) between two node points. See Figure 13.
Main chord	The end of the main chord or connector is deformed to such an extent that the truss can only be connected to another truss by using considerable force.
Main chord	Scratches or signs of attrition on the surface of the main extrusions that reduce the wall thickness by more than 25% or the cross-sectional area of the tube by more than 10%.
Main chord	Indentation/dent deeper than the wall thickness.
Main chord	Holes appearing in the main chord after the truss was taken into use.
Main chord	The deformation of the main chord to an oval shape by more than 5% of the respective diameter.
Main chord	The main tube is distorted or constricted next to the welds due to excessive tensile force.
Main chord	Corrosion causing loss of material.

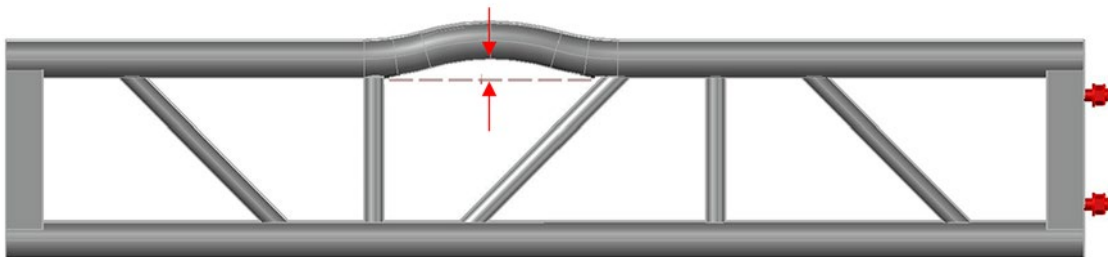


Figure 13: Main chord bent between two node points

14.5 Diagonals and end braces

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded. The term "brace" refers to a diagonal, horizontal or vertical member.

Part	Failure symptoms
Braces	Breaks or cracks in a brace.
Braces	A brace no longer exists.
Braces	A brace is displaced from the original center line by $L/300$ (length divided by 300) or 0.12 in (3 mm), whichever has the smallest value. See Figure 14.
Braces	Scratches, indentations or signs of attrition on the surface of the section that reduce the wall thickness by more than 25% or the cross-sectional area of the tube by more than 10%.

Part	Failure symptoms
Braces	Holes appearing in the brace after the truss was taken into use.
Braces	A brace shows a deformation to an oval shape by more than 5% of the respective diameter.
Braces	Corrosion causing loss of material.

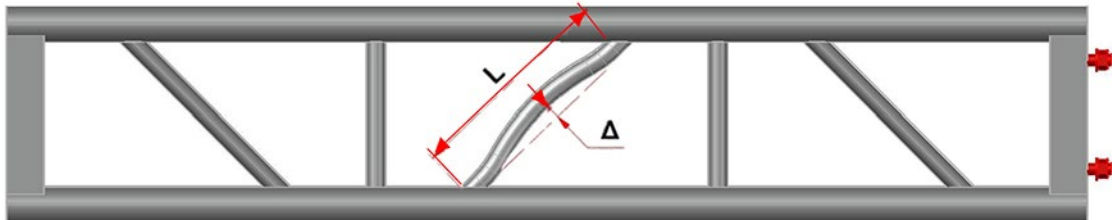


Figure 14: Bent diagonal

14.6 Connectors or camplates

If any part of the product shows any of the following damages, the product is unfit for further use and must be discarded.

Part	Failure symptoms
Connectors	Cracked or partially broken welding seams between the main tube and the connector.
Connectors	Oval signs of wear in the pin hole greater than 10% of their respective diameter.
Connectors	Any visible ovalization of pin holes due to overload.
Connectors	If a connector is deformed to such an extent that the truss can only be connected to another module by using considerable force.
Connectors	Corrosion causing loss of material.
Connectors	Scratches, cuts or hammer stroke indentations on the connector to a depth of more than 0.08 in (2 mm) and that are longer than 0.39 in (10 mm), regardless of the direction.
Camplates	Signs of permanent deformation on the camplates when checked with a straight edge at bolt hole locations. The focus should be at bolt hole locations.
Camplates	Signs of elongation/ovalization in the bolt holes from bolt threads and repeated use. Oval signs of wear in the bolt holes greater than 10% of their respective diameter.



14.7 Connecting hardware

Connecting hardware is subjected to wear when inserted and removed frequently, especially due to hammer strokes. Connecting hardware can be regarded as consumables.

WARNING

Do not re-zinc truss pins, as they are made of high-grade steel. Re-zincing may cause hydrogen embrittlement.

If the connecting hardware shows any of the following damages, replace the connecting hardware in question.

Part	Failure symptoms
Connecting hardware	Signs of galvanic corrosion.
Pin or bolt	Signs of pressure areas on the pin or bolt.
Pin or bolt	A bent pin or bolt.
Pin	Any damage to the smooth surface of the pin.
Pin	Burrs, mushroom heads or other protruding, sharp or pointed edges at the narrower end of the pin. See Figure 15.
R-clip hole	Deformations on the R-clip hole make it impossible to fit the R-clip.
Self-locking nut	A re-used self-locking nut. Self-locking nuts are for single use only.

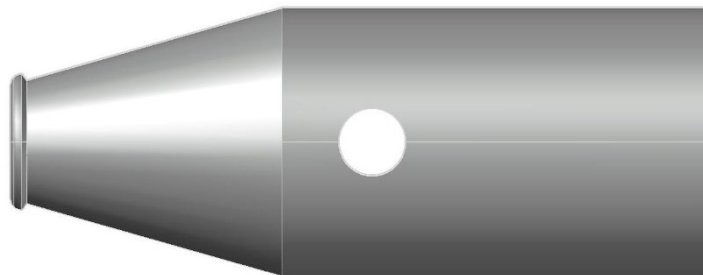


Figure 15: Mushroom head on the clevis pin

15 Warranty

Tomcat guarantees its products will be free from defects in workmanship and materials at the time of purchase, providing the purchaser follows the manufacturer's guidelines for use. The product will be guaranteed for a period of one year from the date of shipment to perform according to the published product specifications. Tomcat is not responsible for damage to the product during transit, nor in cases where load specifications were exceeded or where guidelines for usage were not followed.

Except as expressly stated and warranted herein: (i) Tomcat disclaims any other warranties, whether expressed or implied, including any warranty of merchantability or fitness for a specific purpose; (ii) unless project engineer reports are included, Tomcat has made no affirmations of fact or promise relating to the goods being sold that has become the basis of this bargain, or that has created or amounted to express warranty that the goods would conform to any such affirmation or promise; (iii) this warranty extends exclusively to the original purchaser of the warranted goods and subsequent purchasers are not covered by this warranty; (iv) this warranty does not apply to a part which the buyer misuses, damages, improperly maintains, repairs, or replaces with a part not of Tomcat's manufacture; and (v) except for its duty to repair or replace defective parts, Tomcat shall not be liable for any consequential or incidental damages resulting from a defective part.

Tomcat reserves the right to change materials or design, when, in our opinion, such changes will improve the product. This warranty is performed in the geographic location where the originating order was placed and all obligations, rights and duties of the buyer and Tomcat shall be governed by the laws of that same geographic location.

Truss inspection documentation



Inspection date _____

Inspector _____

Reason for the inspection

- First purchase
 Inspection after accident, incident or malfunction
 Periodic inspection

Truss system _____

Type of component _____

Serial number _____

Overview of criteria to be checked for discard

(in accordance with the TOMCAT Truss User Manual Part 1: General instructions)

		A	B	C	D	E	F	G
1	Global geometry	Bending	Not easy to connect	Torsion				
2	Main chords	Breaks / Cracks	Bending	Not easy to connect	Corrosion	Scratches, Indentations, Abrasions	Ovalization	Distortion, constriction
3	Diagonals / End frames	Breaks / Cracks	Not existing	Bending	Corrosion	Scratches, Indentations, Abrasions	Ovalization	
4	Connector	Not easy to connect	Corrosion	Scratches, Indentations, Abrasions	Oval signs of wear in pin hole	Ovalization of pin hole due to overload		

Legend	Failure mode does not exist	Failure mode exists

If failure mode present:

Cell number Description of failure mode

Should the component be discarded?

Yes No

Contact details:
TOMCAT USA, Inc.
5427 N. National Dr.
Knoxville, TN 37914
USA
Tel. 1 (865) 219-3700
sales@tomcatusa.com