PROLYTE PRODUCTS

Read this manual carefully and understand all of it's contents before you assemble and load the Prolyte Truss.

GENERAL MANUAL FOR PROLYTE TRUSS

Version 3, March 2010

PART 1 OF 2

Industriepark 9, 9351 PA Leek, The Netherlands
phone: +31 (0)594 85 15 15, fax: +31 (0)594 85 15 16
e-mail: info@prolyte.com, website: www.prolyte.com

CONTENTS

PROLYTE PRODUCTS GROUP - phone +31 (0)594 85 15 15 - fax +31 (0)594 85 15 16 - www.prolyte.com

1. PREFACE

This preface explains how to interpret the symbols and text styles in this manual.

Warnings and cautions contain important information that can protect you, the structural elements, and the construction.
Always read warnings and attentions.

Notes contain additional information. Some notes contain basic information for inexperienced users. Others provide extra information or tips for experienced users.

WARNING!
The information in a warning protects against bodily harm or loss of life

CAUTION!
The information in an caution protects against damage to the structural elements or optional external parts

NOTE
The information in a note provides supplementary information for inexperienced and/or advanced users

NOTE:
To simplify reading of this manual the word structural component is used to refer to structural elements elements and all structural elements such like, but limited to:

- Truss lengths
- Truss columns
- Truss corners
- Tower components
- Box corner
- Sleeve blocks
- Brackets
- Adapters
- Compresion beams
- Pins
- Clamps
- Specials

Etc....

This manual has been written for all the users of Prolyte structural elements. Make sure that you read and understand this manual completely before using the structural elements.
This manual should be accessible for everyone assembling, disassembling or using the structural elements.
Save this manual for later use. At request, we can send you an additional manual or you can download it from the Prolyte website. (www.prolyte.com)

For health and safety reasons people assembling, disassembling, transporting and maintaining structural elements
should wear adequate Personal Protection Equipment like, but not limited to, gloves, sound protection, hard heads and safety shoes. The noise levels during assembly and disassembly can exceed 80dB. Elements weighting 20 kg or more shall be carried by at least 2 persons. Artists, performers or people who have to be on the stage or in the vicinity of 50 cm shall be instructed and informed about correct use and possible dangers before use.

2. SCOPE

Structural elements are designed to build permanent and temporary structures to support loads like but not limited to, light, sound and set-pieces, drapes, cyclorama's etc.

3. LIMITATIONS OF USE

Structural elements shall always be used within the limits of the structural report. Loading figures mentioned are only valid for static loads . Self weight is already taken into account. To meet BS, ANSI and CWA standards for structural elements (especially trusses) in repetitive use all loadings shall be multiplied with 0.85. All other structures made of structural elements need dedicated structural reports. Never mix structural elements from different manufactures.

Prolyte structural elements described in this manual are not PARTICUALRLY designed for lifting people! Adequate load-reduction and safety precautions, according to local legislation, must be taken when people are lifted.

Structural elements can be used in environmental conditions varying from -20dgr up to +60dgr Celsius. Special attention should be taken if structural elements are exposed to icing or if water can intrude into extrusions and can freeze. Chemical reactions with other materials shall be considered at any time.

PROLYTE PRODUCTS GROUP - phone +31 (0)594 85 15 15 - fax +31 (0)594 85 15 16 - www.prolyte.com

Special attention shall be taken when structural elements are in contact with salt water or its near vicinity. The aluminium used is not particular suitable for this environment. Direct contact with concrete shall be avoided by means of a sealant. In case of a permanent installation Aluminium or Stainless steel connecting pins and accessories are advised above plated steel parts.

All bolts and nuts used in the line of forces, shall be fastened by means of a torque wrench. When bolts are connected treaded aluminium components the torque setting are M12 > 25Nm, M16 > 50Nm.

4. TRANSPORT AND STORAGE

WARNING:
Always wear hard heads, safety shoes, sound protection and protective gloves when moving, assembling or disassembling structural elements

1. Treat the structural elements with care. Don't drop them, don't drag them around and don't throw sections on top of each other.
2. Prevent damage from sharp edges such as the forks of a forklift.
3. Dedicated dollies can be highly effective means for transportation and storage, while providing the structural elements-sections with some extra protection.
4. Vertical transportation or stocking of structural elements can be hazardous for reasons of falling.
5. Avoid physical contact with unprotected steel at all times.
6. Make sure structural elements can not move and shake during transport. Due to the softness of aluminium the abrasive working of moving or shaking can lead to severe damage.

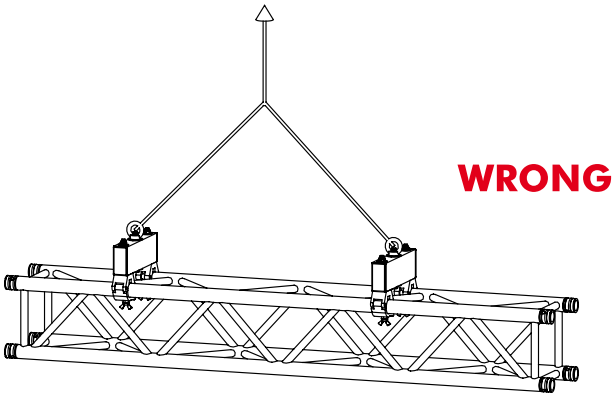
5. APPROVED ACCESSORIES

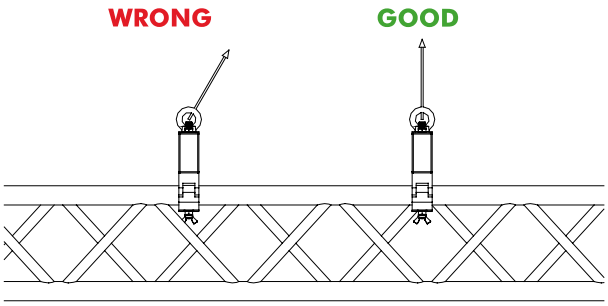
A full range of accessories is available. For a complete overview of approved parts we refer to our brochures.

It is of great importance that accessories never damage the structural element at any circumstance. Special attention shall be taken at using clamps and hooks. It might very well the case that their inner radius does not meet the outer radius of structural element extrusions. This can lead to severe damage.

6. APPROVED SLINGING METHODS

We refer to Part 2 for each type of structural element to take note of the correct slinging method





7. DO'S AND DON'T

DO

- Clean, check and maintain your structural elements on a regular basis, as this will improve ease of assemblyand its lifetime.
- Throw away damaged or deformed structural elements.
- Make a structural calculation for each construction you build.
- Store and transport your structural elements on proper dollies.
- Use copper hammers for assembling, as this will reduce damage to the structural elements.
- Attach loads in node points solely.
- Check how loads are attached to the structural elements before lifting.

DON'T

- Mix H and X version of structural elements in one construction.
- Mix structural elements of multiple suppliers in one construction.
- Exceed the maximum loading and given structural data.
- Drill holes in structural elements.
- Use damaged structural elements.
- Climb on structural elements while attaching yourself to a structural element without taking specific measures to bear loads caused by fall arrest equipment.
- Attach loads to the structural elements diagonals.

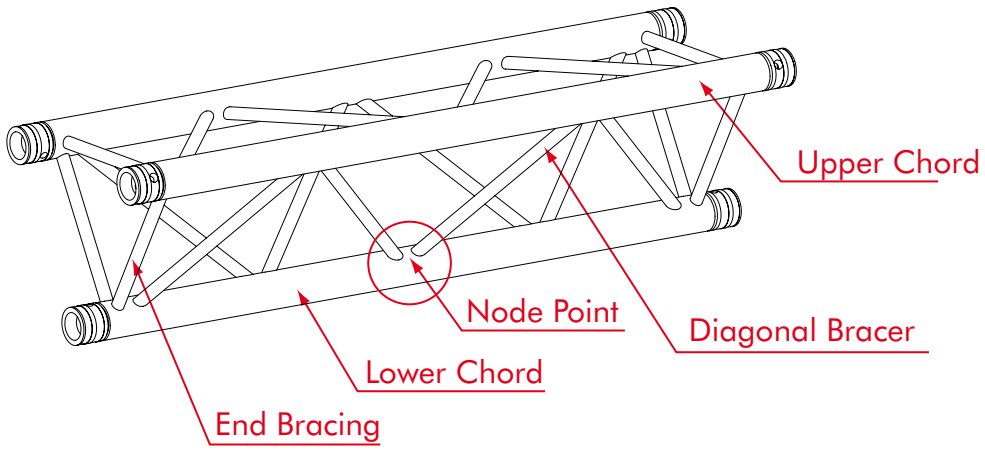


Figure 1. Node points

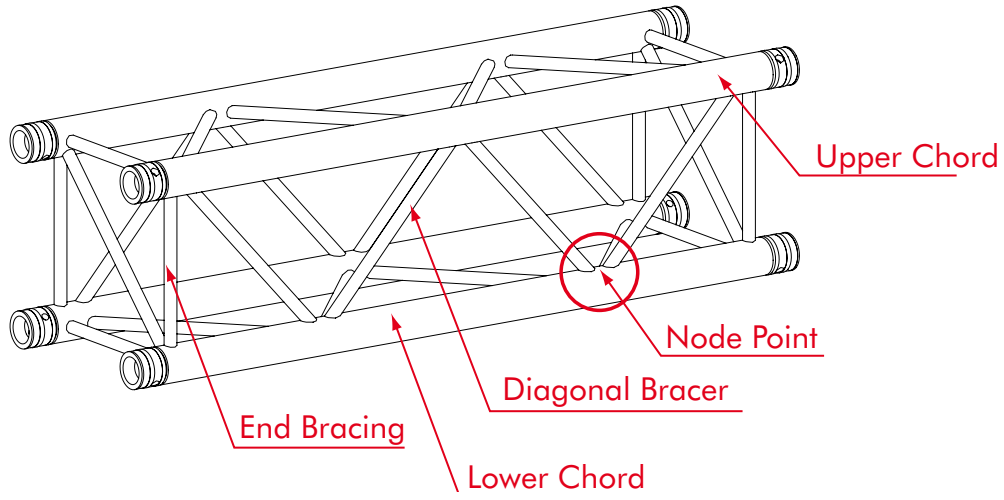


Figure 2. Node points

8. LEGISLATION

	USE
AI-17	Health and safety requirements -lifting equipment / Netherlands
BGV C1 / GUV 6.15	Staging and Production Facilities for the Entertainment Industry / Germany
BS 7906-2	Code of practice for use of aluminium and steel structural elements and towers / England
NPR 8020-10	Entertainment-rigging-design factors of safety / Netherlands
TISE	The institution of Structural Engineers, Temporary Demountable structures, guidance on use, procurement and design / England
VPLT SR 1.0	Code of practice for event technology- Provision and Use of Truss Systems / Germany
	MANUFACTURING
CWA 15902-2	Lifting and Load-bearing Equipment for Stages and other Production Areas within the Entertainment Industry - Part 2: Specifications for design, manufacture and for use of aluminium and steel structural elements and towers
BS 7905-2	Specification for design and manufacture of aluminium and steel structural elements and towers
BS 8118	Structural use of Aluminium part 1 code of practice for design
DIN 1055 (all parts)	Design loads on buildings - all parts
DIN 18000-1	Steel structrures; design and construction
DIN 4112	Temporary structures, fairground amusements, directives for dimensioning and construction
DIN 4113-All parts	Aluminium constructions under predominantly static loading; static analysis and structural design
EN 10002-1	Metallic materials – Tensile testing – Part 1: Method of testing at ambient temperature
EN 10067:1997	Hot rolled bulb flats, Dimensions and tolerances on shape, dimensions and mass
EN 13155	Cranes-safety-non-fixed load lifting attachments
EN 1990	Eurocode 0 Basis of structural design
EN 1991 all parts	Eurocode 1 Actions on structures
EN 1999 all parts	Eurocode 9 design of Aluminium structures
EN 30042:1994	Arc welded joints in aluminium and its weldable alloys - Guidance on quality levels for imperfections.
EN ISO 3834-1 & 3	Quality requirements for welding - Fusion welding of metallic materials – Part 1: Guidelines for selection and use Part 3: Standard quality requirements
EN 292-1	Safety of machinery - Basic concepts, general principles for design – Part 1: Basic terminology, methodology
EN 292-2	Safety of machinery - Basic concepts, general principles for design – Part 2: Technical principles and specifications
EN 754 (all parts)	Aluminium and aluminium alloys - Cold drawn rod/bar and tube
EN 755 (all parts)	Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles
EN 515:1993	Aluminium and aluminium alloys - Wrought products - Temper designations
EN 573 (all parts)	Aluminium and aluminium alloys - Chemical composition and form of wrought products
EN 10204:2004	Metallic products - Types of inspection documents
PREN 1090-3	Execution of steel and aluminium structures-part 3 technical rules for execution of aluminium structures

9. INSPECTION

Prolyte encourages careful documented inspection by a competent person at least once a year and possibly more often if the circumstances or intensity of use requires so. If the structural elements is used as lifting equipment, the inspection interval should be according to the machine directive (EC 2006/42) and local legislation for inspection. If the structural element is used as construction equipment, the inspection interval should be according to the building code and local legislation for inspection.

WARNING!
Prolyte structural elements shall be checked and inspected visually for damage or any other aspect, that might negatively affect the safety of the structural elements, prior to each time of use.

GENERAL

1. Responsibility and liability for the safe use of structural elements, lies predominantly with the user itself
2. The open heel in the bracing welds in the 30er and 40er series part of the design and TüV approved.

INSPECTION

Inspect the structural elements, rigging wear and accessories on visual wear or damage of any kind before assembling or using the structural elements at any time! For inspection criteria see table 1.

WARNING!
Using damaged or worn structural element, coupler parts, rigging wear and accessories can lead to dead !

INSPECTION LEVELS

Initial inspections

When first acquired, whether they are new or used, structural element should be inspected in accordance with Table 1, and a record of the inspection maintained.

Regular inspections

Regular visual inspections should be carried out in accordance with Table 1. Regular inspections should be performed by a competent person and should be carried out prior to each incident of use.

Periodic inspections

Periodic visual inspections should be carried out in accordance with Table 1 and a record of the inspections maintained. Periodic inspections should be performed by a competent person and should be conducted at least once each year or in accordance with an inspection routine established by a qualified person.

Structural elements which are subject to any accident must be inspected according to the requirements per periodic inspection and in accordance with table 1.

TABLE 1

	Inspection level			Items to be inspected						
Part	Initial	Regular	Periodic	Chords	Diagonals	Connectors	Welds	Fasteners	Geometry	ID-TAG
	Chapter	Chapter	Chapter							
Missing parts										√
Dents	√	√	√	√	√					
Bends	√	√	√	√	√					
Holes (1)	√	√	√	√	√	√	√	√		
Incorrect repair	√	√	√	√	√	√	√	√		
Abrasion	√	√	√	√	√		√			
Corrosion			√		√		√			
Missing members	√	√	√	√	√	√		√		
Flatness (2)	√	√	√			√				
Deformation	√	√	√			√		√		
Excessive wear	√	√	√			√	√	√		
Cracks	√	√	√				√			
Correct grading (3)	√	√	√					√		
Twisting	√	√	√						√	
Squareness	√	√	√						√	
Bending	√	√	√						√	
Camber			√						√	

(1) not to be part of the construction (2) particular for trusses with connecting plates (3) Minimum 8.8 grade

PROLYTE PRODUCTS GROUP - phone +31 (0)594 85 15 15 - fax +31 (0)594 85 15 16 - www.prolyte.com

INSPECTION FREQUENCY

Structural elements in regular service
Structural elements in regular service should be subjected to regular and periodic inspections.

Permanent installations, stationary
Periodic inspections should be carried out on all structural elements that are permanently installed in a stationary (not moving) configuration. The frequency of inspections should be determined on the basis of the prevalent conditions.

Permanent installations, moving
Periodic inspections should be carried out every three months, or in accordance with an inspection routine established by a qualified person, on all structural elements that are installed in a permanent configuration where movement of the structural elements system is an integral part of use.

Records
Records of initial inspections and periodic inspections should be kept by the owner for each structural elements and should be signed and dated by the person carrying out the inspections.

10. MAINTENANCE AND DISCARD CRITERIA

INTRODUCTION

Apart from the normal requirements with regard to due care in utilization, professional assembly, dismantling, transport and storage of structural elements, regular inspections are vital. A careful visual check of the individual elements before each use, independent of the respective field of utilization, shall be performed. Regular tests of the structural elements should be carried out at least once a year by an expert and documented in written form. If the structural elements are used intensively, regular inspections should be performed at shorter intervals. If deficiencies are noted during an inspection of structural elements that preclude further safe use, the structural elements must be taken out of service and scrapped. Identification of the deficiency cannot be considered sufficient in most cases. Disposal via the manufacturer/supplier or a metal recycling company is the only safe way of protecting others from risks generated by defective material.
The criteria given here by PROLYTE for the discard of structural elements shall be incorporated fully into the inspection.

DISCARD AND REJECTION CRITERIA

Structural elements are considered to be rejected form service if they display one or more of the criteria mentioned in this manual.
In case of doubt the manufacturer/supplier or an expert should be asked for their opinion.

GENERAL

- Although aluminium may not develop corrosion the way many steel alloys do, nevertheless ambient influences can impact on aluminium corrosively. Care should be taken with structures that are placed outdoors for a long time, in particular in areas with a high level of industrial pollution, near salt water, near tram lines, near swimming pools, structural elements should be checked individually before each use as to whether the expected pollution has had a corrosive effect.
- If any part of a structural elements shows significant visible damage or is suspected of containing a damaged element (visible or not), the structural elements should be taken out of service and marked accordingly. A qualified person should carry out an assessment of the structural elements.
- Repairs should be carried out and warranted by either the manufacturer or a suitably qualified person.
- Regularly smooth the surface of coupling parts with fine sandpaper.
- Keep them slightly lubricated with silicone oil, spray or similar lubrication Any lubricant used should not be "sticky", thus preventing the gathering of dirt, dust or small parts of debris.
- Prevent the drying of spray-painted coupler components when in position, this has a negative effect on the precise fit.
- Remove any kind of debris from structural elements and there components. Do not use any abrasive methods.
- Welds which have cracks or other irregularities. The incomplete welding seams around the diagonal braces are production-related and their stability has been proved (TÜV tested).
- Missing identification (name of the manufacturer, structural elements type and date of production).
- Lasting (3D) deformation of the structural elements by rotation, bending or torsion or other deformation with resultant deviation from the original shape.
- Reduction of the raised level of the welding seam by mechanical wear by more than 10%.
- Excessive corrosion whereby the total cross- sectional area of the structural elements is reduced by more than 10%.

NOTE
Damaged or worn material shall be clearly marked and immediate taken out of service.

EXTRUSIONS

If one or more of the main extrusions breaks or shows cracks, or if one or more of the main extrusions is rolled by more than 10% of their respective diameter from the original centre line then the structural elements is unfit for further use. The same applies if the ends of the main chord of a structural elements are rolled in the area around connector, connecting the structural elements to another element only possible by exerting considerable force.

Further signs of a discard condition are:
- Scratches, cuts or signs of attrition on the surface of the main extrusions that reduce the cross-sectional area of the tube by more than 10%.
- Scratches, cuts or indentations in the main tube to a depth of more than 1mm and a length of more than 10mm, irrespective in which direction.
- Holes which appear after the structural elements is brought into use.
- The remaining (plastic) deformation of the main chord to an oval shape or indentation of the tube by more than 10%.

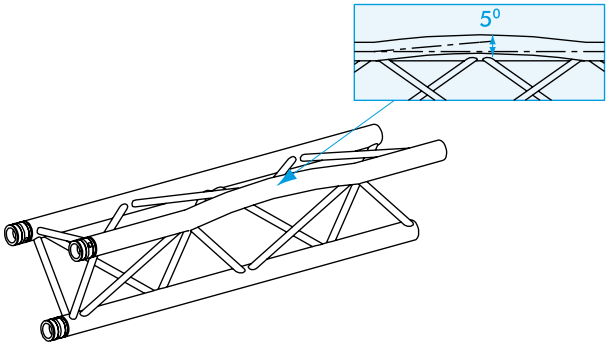


Figure 16. Bending of the main chords.

BRACES

If one or more diagonal braces, end braces or cross braces is broken or no longer exists, the structural elements is not usable. The same applies for braces rolled by more than 10° of their diameter from the centre line. Further signs of a discard condition are:
- Scratches, cuts or signs of wear on the surface of the braces that reduce the cross-sectional area of the braces by more than 10%.
- Scratches, cuts or indentations in the braces to a depth of more than 0.5 mm and a length of more than 10 mm, irrespective in which direction.
- Holes which appear after the structural elements is brought into use.
- The remaining (plastic) deformation of a brace to an oval shape or indentation of the brace tube by more than 10%.

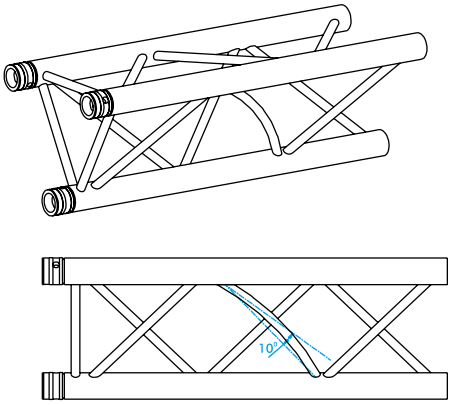


Figure 17. Bending of the braces.

CONNECTORS

Signs of a discard condition are:
- Cracked or partially broken welding seams between the main tube and the connector.
- Oval signs of wear in the drill holes greater than 10%.
- Rotational displacement for the drill holes for the bolt holes in a CCS connector or between two adjoining connectors by more than 2°.
- Deflection of the main chord ends with connector by more than 5° which makes connecting two structural elements elements during assembly more difficult.
- Signs of wear on the connector or the connector that reduce the cross-sectional area by more than 10%.
- Deformation or distortion in the main chord area next to the welds of the connector.
- Overloading by excessive force causes buckling.
- Overloading through excessive tensile force can cause diminution of the main tube next to the welds.
- Each scratch, cut or hammer stroke indentation on the connector to a depth of more than 2 mm and that is longer than 10 mm, independent of the direction.
- Excessive corrosion in the connector.

PROLYTE PRODUCTS GROUP - phone +31 (0)594 85 15 15 - fax +31 (0)594 85 15 16 - www.prolyte.com

For systems that have remained assembled for more than one year indoors or for 2 months outdoors, new, galvanized bolts should be used or stainless steel in order to prevent possible dangers by galvanic corrosion.

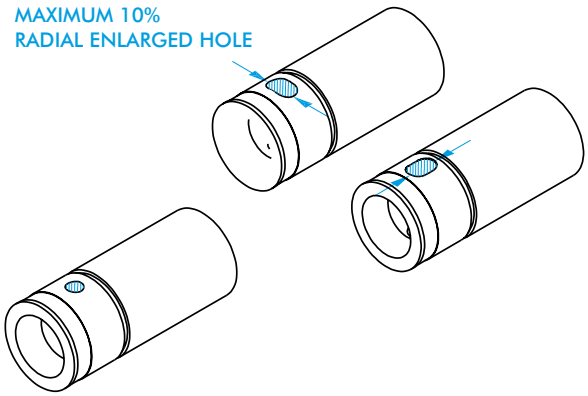


Figure 18. Oval-shaped holes.

PINS

Pins undergo wear when inserted and removed frequently, in particular by hammer strokes. They can be regarded as consumer goods.
Pressure areas and deformations in the bolts are indications of a massive overload.
If a bolt shows such a change, it may not be used any longer.
Further signs of a discard condition:

- Cuts, indentations, scratches and other damages on the smooth surface of the pin.
- Burrs, mushroom heads and other protruding, sharp or pointed edges at the narrower end of the pin.
- Deformation through hammering which causes wear on the cross-hole or damage to a screw thread.
- Attrition of the zinc coating on any part of the bolt, causing this to corrode.
- No self-locking nuts may be used if the nylon safety mechanism is clearly damaged by wear.

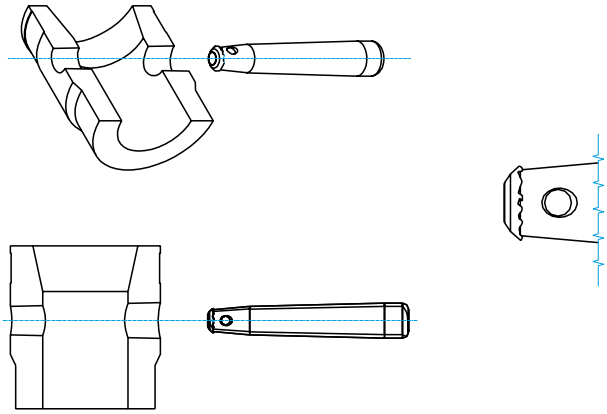


Figure 19. Damaged spigot pins.