FW-FWI660-13

PACIFIC AERIAL

TOW HOOK INSTALLATION

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS AND COMPONENT MAINTENANCE MANUAL

FLIEGEN WORKS INC.

dba:

PACIFIC AERIAL TOW HOOKS

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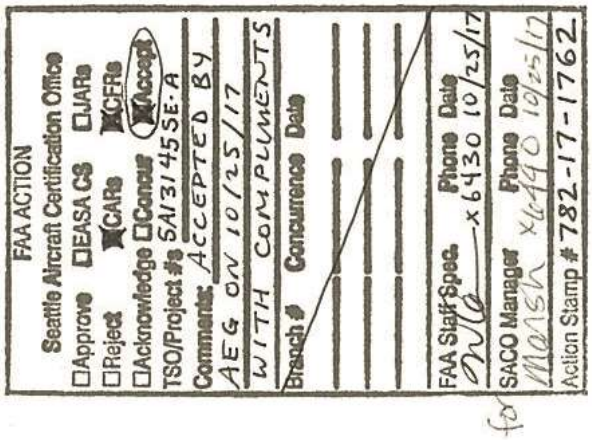
(503) 221-4001

This ICA must be followed when the PATH Tow Hook System is installed in accordance with Supplemental Type Certificate, (STC) No. SA220SO, dated 1 February 2017.

The information contained in this document supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this manual, consult the basic aircraft ICA or Maintenance Manual.

SEE AML SA220SO FOR MAKE AND MODEL INFORMATION



STATEMENT OF INITIAL CERTIFICATION

This manual complies with Federal Aviation Association (FAA) Airworthiness Requirements _____.

FAA Acceptance: _____ Date: _____

The above certification does not apply to revisions or amendments made after the date of initial certification by other Approved Organizations. Revisions or amendments made by other Approved Organizations must be separately certified and recorded on separate record sheets.

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RECORD OF REVISION

REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO	ISSUE DATE	DATE INSERTED	BY	REV NO	ISSUE DATE	DATE INSERTED	BY
IR	05/01/17	N/A									

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LIST OF EFFECTIVE PAGES

Current revision status and revisions to this document may be obtained from

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A subscription for revisions is available; contact Fliegen Works Inc.

Notice of revision availability is sent to the registered owner of each kit. If you are the owner of this system, and your information has changed, please send the new ownership information to the above address, including a valid email address

TABLE OF CONTENTS

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INTRODUCTION

1. General

This Component Maintenance Manual (CMM) and Instructions for Continued Airworthiness, (ICA) contains the maintenance instructions to install, maintain, inspect, and repair the Pacific Aerial Tow Hook Installation on a variety of aircraft. This manual establishes limitations and presents requirements for testing, disassembly, cleaning, checking, inspection, repair, and assembly of the tow hook. When in conflict with other referenced documents, this CMM supersedes all other documents.

A. How to Use this Manual

(1) Arrangement

This document closely follows ATA 100 Specification format for a component maintenance manual. Listed below are the sections and their contents:

- Description and Operation: General overview of the Pacific Aerial Tow Hook and its operation.
- Limitations: Limitations, scheduled, and special inspections of this equipment to maintain it in an airworthy state.
- Testing and Fault Isolation: Information provided for testing of this component to determine likely faults, isolate those faults, and provide corrective action.
- Maintenance Practices: Step-by-step instructions for disassembly, assembly, and cleaning of the tow hook and its related equipment.
- Installation/Removal: Step-by-step instructions for installing and removing the Pacific Aerial Tow Hook on various aircraft, along with instructions for installing related equipment.
- Inspection/Check: Detailed instructions after cleaning and corrective action, where applicable.
- Repairs: Information pertinent to repairing the Pacific Aerial Tow Hook System.
- Fits and Clearances: Tolerance, wear limits, and torque values for components.
- Special Tools, Fixtures, and Equipment: Items necessary for maintenance of the Pacific Aerial Tow Hook.
- Illustrated Parts List (contains a Detailed Parts List): Lists all necessary parts for maintenance support of the Tow Hook assembly and structural attachments.

Instructions are supported by illustrations as required.

B. In-Process Inspection

In-process inspection requirements are provided within the document where most relevant and applicable. Detailed inspection requirements are provided for each major operation of overhaul, such as disassembly, cleaning, repair, replacement, and modification, as applicable.

C. Tolerances, Wear limits, Corrosion Limits, Torque Values, and Adjustments.

All maintenance shall comply with the wear limits, fits, and tolerances as listed in this CMM.

D. Worn or Defective Parts

Parts, components, subassemblies, or assemblies found worn or defective beyond the repairable limits established by this document will be condemned and disposed of.

E. Repair, Rehabilitation, and Reconditioning

The repair, rehabilitation, and reconditioning of equipment and their components specified herein shall be accomplished in accordance with specific instructions set forth in this CMM. Tolerances and limits set forth herein are the minimum and maximum acceptable standards. However, these repair procedures are not mandatory if the repair facility is able to develop satisfactory procedures for repair. Any repair procedures developed by the repair facility shall be documented and require separate FAA approval.

F. Repair and Renovation

This document requires repair and renovation of parts to within the dimensional and tolerance specifications noted herein.

G. Warnings, Cautions, and Notes

Personnel performing operations, procedures, and practices included or implied in this maintenance manual shall observe the following warnings. Disregarding these warnings and precautionary information may cause serious injury, death, or destruction of material.

Warnings: Warnings call attention to the use of materials, processes, methods, procedures, or limits that must be followed precisely to avoid injury to persons.

Cautions: Cautions call attention to methods and procedures that must be followed to avoid damage to equipment.

Notes: Notes call attention to methods that make the job easier.

H. Quality Assurance /Quality Control (QA/QC)

(1) Responsibility

The facility performing the overhaul (hereafter referred to as the repair facility) is responsible for the performance of all inspections specified herein. The repair facility may utilize its own facilities or any other commercial laboratory acceptable to the FAA. The FAA reserves the right to perform any of the inspections specified herein when such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

(2) Quality Assurance Terms and Definitions

For quality assurance terms and definitions, refer to MIL-STD-109.

References

Part Number	Nomenclature
MIL-C-45662	Calibration System Requirements
MIL-P-116	Methods of Preservation
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-2219	Fusion Welding for Aerospace Applications
MIL-STD-6866	Penetrant Inspection
AC43.13-1B	Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair
AC43.13-2B	Glider and Banner Tow-Hitch Installations
FAA-H-8083-13A	FAA Glider Handbook

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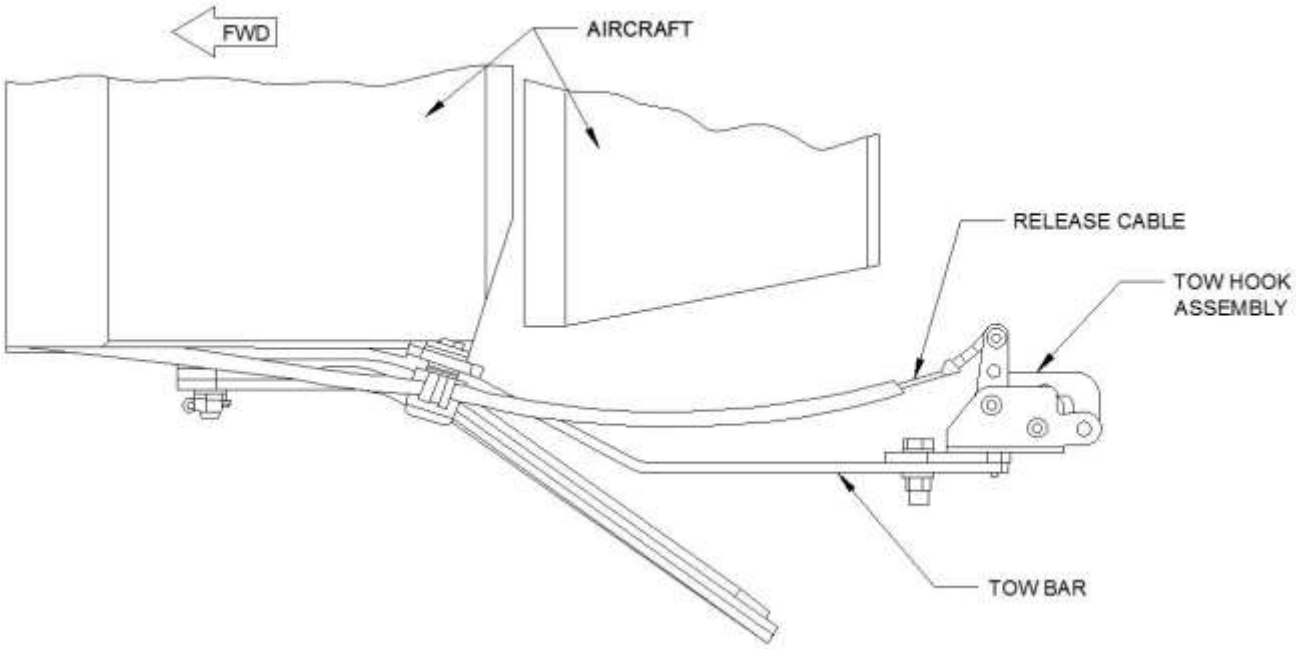
DESCRIPTION AND OPERATION

1. Description

A. General

The Pacific Aerial Tow Hook *Provisions for Tow Release,* STC SA220SO includes a tow hook, mounting bracket and the associated hardware needed for assembly and installation. An optional release handle is provided for the owner to install in a suitable location. (The exact location and mounting of the release handle is determined by the installer, making this a provisions only STC.) The tow hook attaches to a tow bar which may be installed on the aft end of various aircrafts. The system is designed to allow a pilot to safely tow and release either a banner or glider. The tow hook may also be used as a means of attachment, allowing a pilot to safely start their aircraft via hand prop.

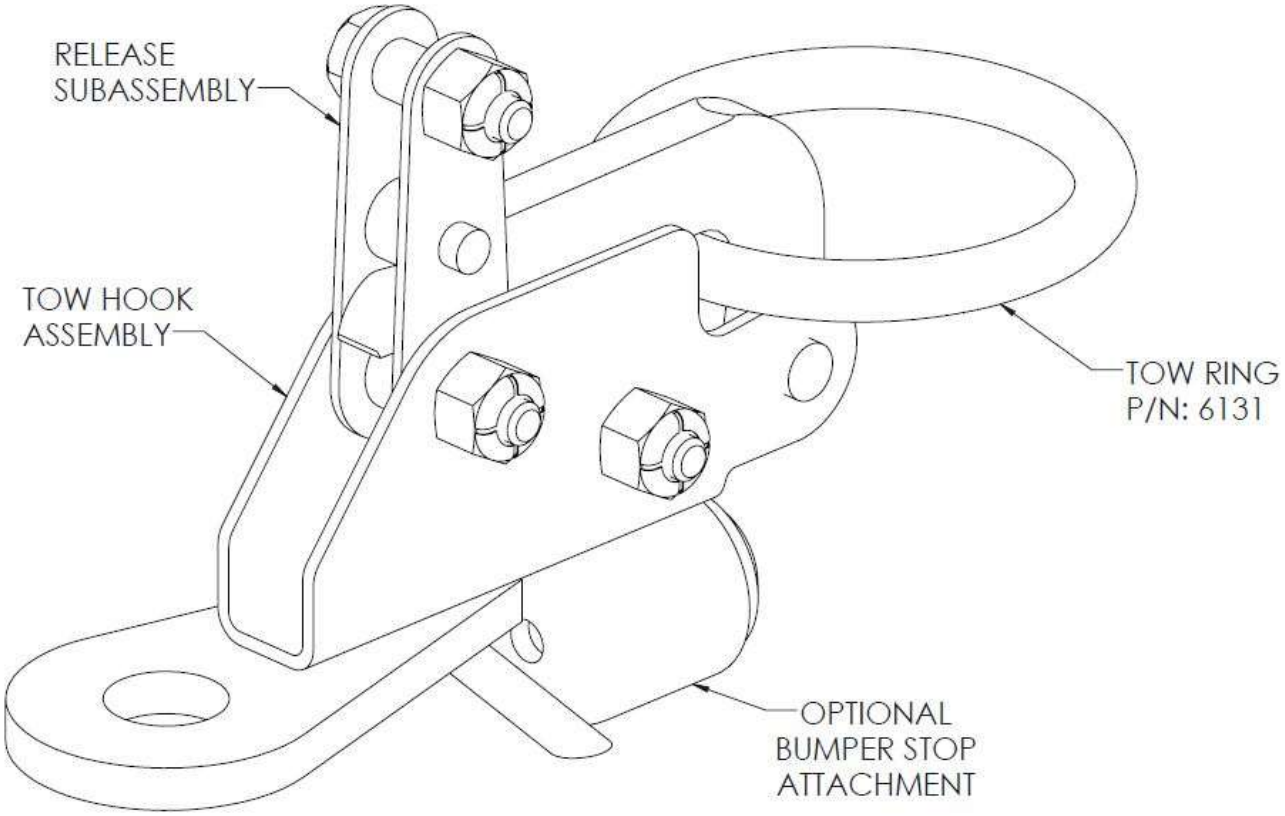


Pacific Aerial Tow Hook Assembly Installed on a Piper J-3 Cub
Figure 1.1

There are two versions of the Pacific Aerial Tow Hook; the “Weld On” assembly and the “Bolt On” assembly. This CMM and ICA is applicable to both tow hook variants. Both versions of the tow hook also allow for an optional Bumper Stop attachment which prevents the hook from striking the hook housing upon releasing a load.

The maximum design load for the Pacific Aerial Tow Hook is 1200 lbs. This load rating has been tested using a safety factor of 2.0 (2400 lbs.) without failure.

Caution: The Pacific Aerial Tow Hook is only for use with the Pacific Aerial Tow Ring (P/N: 6131), or Tow Link – Safety (P/N 1000). **Do not attempt to use any other tow ring.** Use of any other tow ring with the Pacific Aerial Tow Hook may cause jamming or a failure to release the load.



Pacific Aerial Tow Hook ("Bolt On" Assembly with Optional Bumper Stop)
Figure 1.2

The geometric design of the hook housing prevents the tow ring from moving forward under abnormal tow angles which in turn prevents constant loading and jamming of the Release Subassembly. The Release Subassembly also features geometry which provides additional release leverage and a hardened roller to reduce release friction.

Warning: The Pacific Aerial Tow Hooks are designed specifically for aircraft that tow banners or gliders. The PATH tow hooks have not been evaluated or approved to be used on gliders as a tow release. The installer must determine the suitability of the tow hook design and installation before using these tow hooks for any other purpose. Improper installation and use of the Pacific Aerial Tow Hook can lead to damage of property, injury, and death.

2. Operation

Normal operating data follows, assuming an assembly has been completely installed and passed the pre-flight check. The pre-flight check is defined in the Airworthiness Limitations of this document. Refer to the Installation/Removal section of this document if the system is not installed. These are general guidelines adopted from the Glider Handbook, FAA-H-8083-13A. That handbook should be reviewed by the operator.

A. Glider Towing

These instructions refer to handling of the Tow Hook Assembly before takeoff.

(1) Line up the glider and tow plane on the runway with the tow plane in the lead position. Both aircraft should be facing into the wind.

(2) The aircraft should be separated by the approximate length of the tow rope.

(3) Hook the tow rope into the tow hook of the tow plane.

(4) The tow pilot must carefully remove slack from the tow rope between the glider and tow plane.

(5) Once the glider is determined to be securely attached to the tow plane via the tow rope and tow hook, take off is initiated.

B. Releasing the Glider

These instructions refer to handling of the Tow Hook Assembly during flight.

(1) Once the tow pilot has towed the glider to a predetermined altitude and location, the glider pilot must release the glider from the tow line.

(2) The tow pilot will then return to the airfield and drop the tow line via the tow hook release handle before landing.

(3) Visually verify the tow line has been dropped before landing to prevent any potential damage to the aircraft during landing.

C. Banner Towing

These instructions refer to handling of the Tow Hook Assembly before takeoff.

(1) Before towing, the banner should be laid out on the ground extended to its full length.

(2) The lead end of the banner must be attached to a tow line terminated with a large loop at the end.

(3) Tie a grapple hook to a tow rope with a tow ring attached. The tow ring should be opposite the grapple hook on the tow rope.

(4) Secure the tow ring into the tow hook assembly.

(5) Stow the grapple hook and tow rope in the aircraft. They should be within easy reach and access for the tow pilot. Take care they do not interfere with any aircraft controls.

(6) After takeoff is initiated and the pilot is ready to catch the banner, the pilot must carefully toss the grapple hook outside the aircraft which should catch the banner.

(7) As soon as the grapple hook has snagged the loop of the banner tow line, the tow pilot must immediately begin a steep climb to minimize any damage caused by dragging the banner on the ground.

(8) The tow plane may then climb to altitude and tow the banner over the intended audience.

D. Releasing the Banner

These instructions refer to handling of the Tow Hook Assembly during flight.

(1) After completing display of the banner, the pilot must return to the airfield at a predetermined location.

(2) The pilot must approach the designated location at a low altitude and activate the tow hook release handle; dropping the banner, grapple hook, and both tow lines.

(3) Visually verify the load has been released from the aircraft before landing to prevent any potential damage to the aircraft during landing.

Note: Aerial billboards should be handled in the same manner as aerial banners.

AIRWORTHINESS LIMITATIONS

Note: The Airworthiness Limitations section is FAA approved and specifies inspections and other maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

1. General

This chapter contains limitations for the Pacific Aerial Tow Hook. Refer to the Inspection/Check section of this document for further detail.

A. Time Limited Items.

There are no life-limited items.

B. Required Inspections Interval.

No required maintenance or inspection tasks.

Note See page 501 for manufacturer suggested inspection intervals.

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TESTING AND FAULT ISOLATION

1. General

This chapter contains procedures for testing the Pacific Aerial Tow Hook. The equipment employed for testing shall consist of that listed in Figure 2.1 and shall conform to the following minimum accuracies:

A. Required Tools and Equipment

Inspection and test equipment required to determine conformance of the Pacific Aerial Tow Hook to the requirements contained in this CMM are listed in Figure 2.1. The table lists the equipment by nomenclature and part number. Possession of all equipment listed is not to be construed as mandatory when the repair facility may have similar equipment onsite or can locally purchase or manufacture adequate equipment to accomplish all job functions in a competent and efficient manner.

Item No.	Part No.	Nomenclature
1		Calibrated Spring Scale

Table of Special Inspection and Test Equipment
Figure 2.1

2. Tow Hook Functional Test

Note: Before any flight is to begin, the No Load Hook Release Test, the Aircraft Release System Functional Test, and the Tow Ring Clearance Test must be successfully completed.

A. No Load Hook Release Test

(1) Engage the Tow Hook Assembly with the Tow Ring in place.

(2) Measure the release effort applied to the Release Subassembly with no load on the Hook or Tow Ring. This must be accomplished using a calibrated spring scale or similar calibrated force measuring device. The release effort must be within the parameters of Table 2.1 seen below.

Table 2.1: No Load Release Force

Test	Hook Load (lbs. of force)	Release Effort
No Load Hook Release Test	Zero (0) lbs.*	Minimum: 4 lbs. Maximum: 10 lbs.

*the Pacific Aerial Tow Ring, P/N: 6131, must be latched in the tow hook for the test as shown in Figure 2.2.

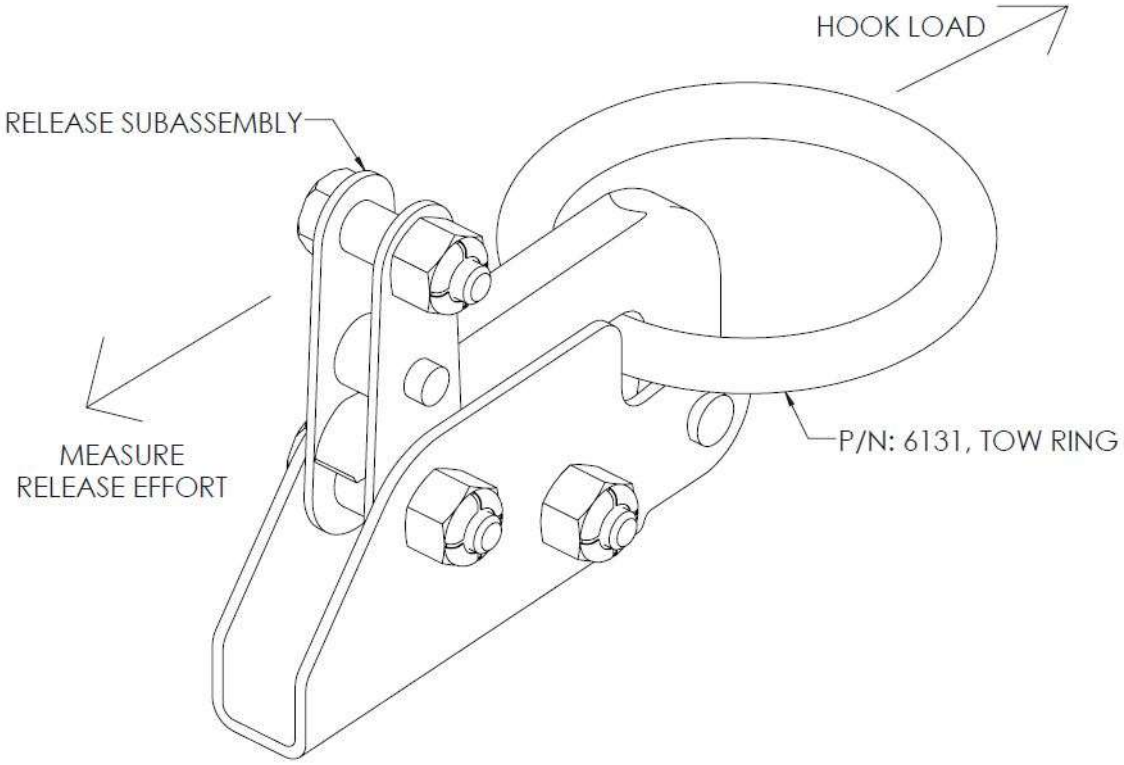

Figure 2.2: No Load Hook Release Test

B. Aircraft Release System Functional Test

(1) Determine the limit load of the tow hook installation as per FAA Advisory Circular AC43.13-2B, Section 804d “Glider Tow Hitch Load Testing”.

(2) Find the row on Table 2.2, seen below, that lists the hook load equal to the limit load. From this row, determine the highest required release force required. This number is the required test force. Reference Figure 2.3 for the corresponding tow angles.

Note: For banner towing, use the calculated test force or a 36 pound test force, whichever is greater.

Table 2.2: Release Force Requirements (in lbs.) for Various Hook Load and Tow Angle Combinations.*

Tow Angle (degrees) / **Hook Load** (lbs.)	**-20°**	**0°**	**20°**
100	8	8	10
200	14	14	16
300	20	20	22
400	24	25	28
500	28	30	34
600	34	36	40
700	38	38	41
800	42	42	44
900	46	48	50
1000	50	51	56
1100	50	54	60
1200**	54	60	64
1300**	62	67	70
1400**	62	74	72

*Table 2.2 is applicable only to the Pacific Aerial Tow Hook. Other tow hooks may require more force.
**1200 pounds is the rated maximum load for the Pacific Aerial Tow Hook. Release forces for 1300 and 1400 pounds are provided for reference only. This Table represents typical test results from a new Tow Hook without wear or service defects.

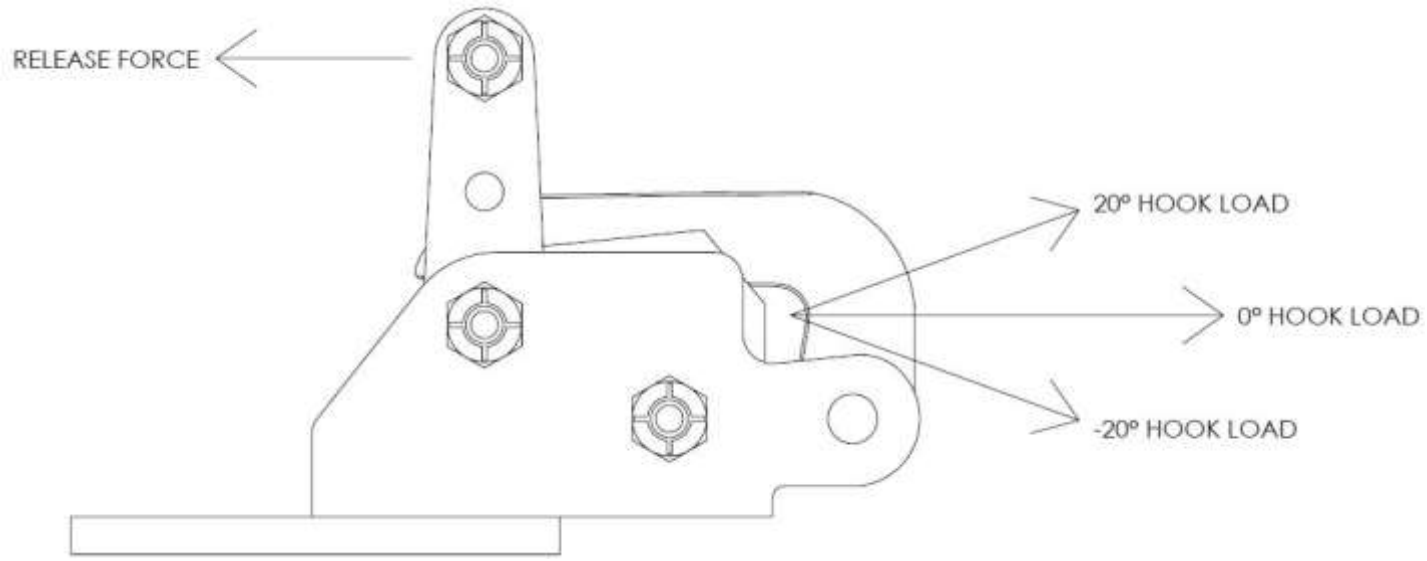

Figure 2.3: Tow Hook Tow Angles, Reference Table 2.2

(3) Engage the Tow Hook Assembly with the Tow Ring in place as seen in Figure 2.2.

(4) Attach a calibrated spring scale, or similar force measuring device, to the release cable at the Release Subassembly.

(5) Pre-load the spring scale to read less than the required test force. An improvised lever may be needed to hold and stabilize the spring scale in place.

(6) While the pilot activates the release handle, observe the spring scale reading.

Note: Multiple tests may needed to determine the proper pre-load on the spring scale.

(7) The spring scale must show a number equal to, or higher than, the required test force. The hook must also release.

C. Tow Ring Clearance Test

(1) Close and latch the Tow Hook with a Tow Ring in place, verifying that sufficient force is required to compress the Rubber Spring and that the Hook applies sufficient locking load against the Release Subassembly after it is engaged.

(2) Verify that movement of the Release Subassembly towards the release position causes additional compression of the Rubber Spring.

(3) Test the Tow Ring clearance as shown below in Figure 2.4. The Tow Ring must be able to freely rotate in place without binding. Rotate the Tow Ring to the opposite vertical position to verify there is no binding of the Tow Ring.

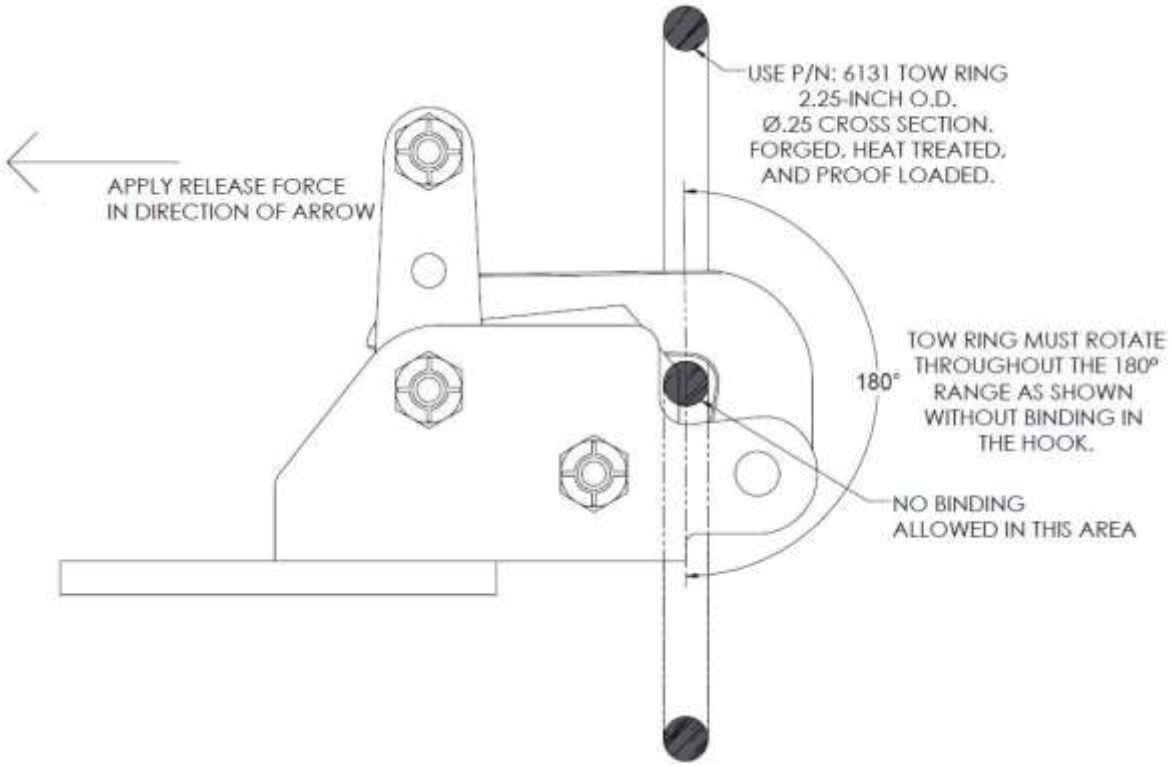

Figure 2.4: Tow Ring Clearance Test

(4) Activate the tow release using the pilot's Release Handle. The Tow Hook must release the Tow Ring without any undue effort or roughness of operation.

If any of the above are found defective, correct the defect or replace the tow hook assembly prior to use.

Warning: Failure to comply with the Tow Hook Functional Test may result in operational failure of the release system causing damage to property, injury, or death to persons. An emergency release may not be possible if the aircraft release system does not have sufficient release force capacity.

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MAINTENANCE PRACTICES

Note: See Testing and Fault Isolation, page 201, to establish the condition of the component or determine the most probable cause of its malfunction. Do this to determine the extent of disassembly required to avoid unnecessarily deconstructing and rebuilding the Tow Hook Assembly.

1. General

A. Required Tools and Equipment

Item No.	Part Number	Nomenclature
1		3/8” wrench or socket
2		Light weight general purpose grease
3		Drill
4		11/16” wrench or socket

B. Safety

(1) Using Toxic/Flammable Materials

Due to the toxicity and flammability of the solvent solutions used in cleaning procedures, adequate ventilation must be provided. Avoid prolonged contact with solutions and chemicals. Do not use dry cleaning solvent or flammable cleaners near an open flame or in an area where very high temperatures prevail.

2. Disassembly Instructions

A. General

This section contains the detailed instructions for disassembly. Cleaning, in-process inspection, processing, repair, assembly, and testing are included in separate sections.

B. Purpose

Pre-shop analysis instructions are provided to determine, prior to beginning overhaul activities, the extent of overhaul required to return the Pacific Aerial Tow Hook Assembly to a serviceable condition as specified herein. These instructions are to be used for examination of the Tow Hook Assembly. This examination provides information to the overhaul facility for use in preparing estimates required to determine the extent of disassembly, repair, modification, and replacement required to overhaul the Tow Hook Assembly to a completely serviceable unit. The examination also provides information relating to work and parts requirements. Quality standards contained in this CMM must be adhered to. Detailed cleaning and corrosion treatment methods are incorporated in this CMM where applicable.

(1) Unpacking

Use reasonable caution when removing the Tow Hook assembly from the shipping container. Place parts on a suitable workbench. Check all tags and forms attached to the Tow Hook and equipment to determine the reason for removal from service.

(2) Cleaning

The external surfaces of the Tow Hook assembly will be thoroughly cleaned before disassembly. Refer to cleaning instructions in this document, page 307, for detailed instructions.

C. Disassembly Criteria

Practices and procedures outlined in this paragraph are to be followed throughout disassembly of the Tow Hook assembly.

(1) Disassembly shall be based on the results of the pre-shop analysis and a thorough visual and mechanical inspection.

(2) Disassembly shall be a complete removal of all parts to the extent required to meet all quality assurance requirements of this CMM and the work contract.

(3) Record and tag all defective parts with the reason for rejection.

(4) Mated and matched parts shall be tagged, handled, and stored together to preclude damage or loss. These parts are not individually interchangeable. If one part requires replacement, replace all parts of the mated or matched set.

D. Removal of Tow Hook Assembly and Tow Bar from Aircraft

(1) Using an 11/16” wrench or socket, remove the AN8-11A Bolt, AN960-816 Washers, and the AN365-820 Nut securing the Tow Hook assembly to the Tow Bar.

Note: If using Tow Hook Assembly P/N: 6027 or 6029, the Tow Hook Assembly may be removed from the Tow Bar by grinding off the welds.

(2) Using a wrench or socket, size varies depending on aircraft, remove the Bolt and Nut securing the Tow Bar to the aircraft fuselage.

Note: Depending on the install, the aircraft tail springs may need to be removed for removal of the Tow Bar. Once the Tow Bar is removed from the aircraft fuselage, reattach the aircraft tail springs including any that were replaced by the Tow Bar.

E. Tow Hook Disassembly Instructions (Refer to Figure 3.1 below)

Subsequent steps list the procedure for disassembling the Tow Hook. Refer to the IPL for a detailed parts breakdown.

Note: Do not disassemble the Tow Hook more than is necessary to determine if parts or assemblies are serviceable for continued use.

(a) Release Subassembly, Roller; Tow Hook, and Bushing; Tow Hook

1 Using a 3/8” wrench or socket, remove the AN3-7A bolt and the MS21044N3 locknut securing the Release Subassembly to the Hook Housing.

2 Remove the Bushing; Tow Hook by sliding it out from between the two straps of the Release Subassembly and the Roller; Tow Hook.

3 Remove the Roller; Tow Hook from between the two straps of the Release Subassembly.

4 Store the Release Subassembly, Roller; Tow Hook, and Bushing; Tow Hook together.

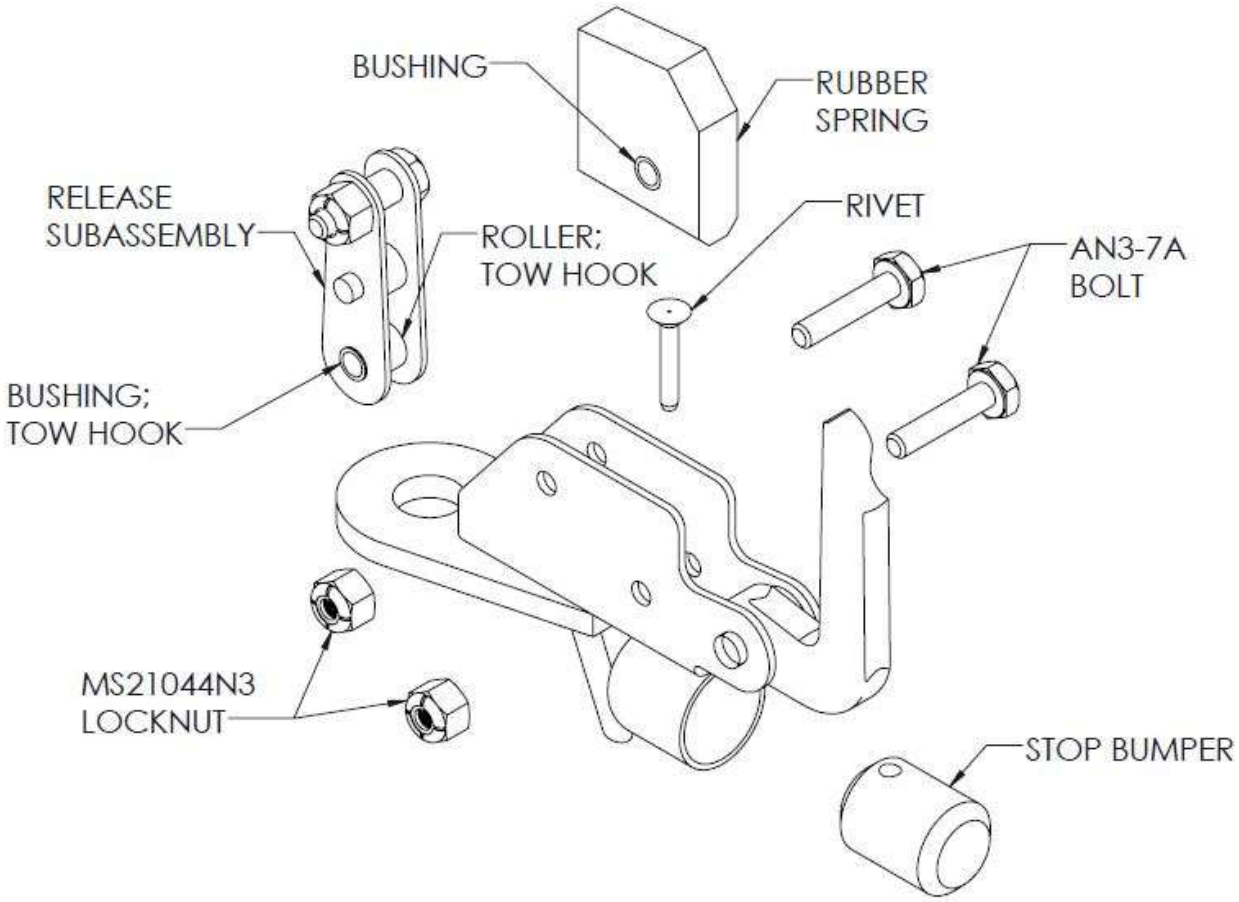

Figure 3.1: Tow Hook Assembly, P/N: 6030 – Exploded View

(b) Rubber Spring and Bushing

1 Using a 3/8” wrench or socket, remove the AN3-7A bolt and the MS21044N3 locknut securing the Rubber Spring into the Hook Housing.

2 Remove the Bushing from the hole in the Rubber Spring.

3 Store the Rubber Spring and Bushing together.

(c) Stop Bumper and Rivet (Only on P/N: 6028 and 6030)

1 Remove the loose MS20426AD4-13A rivet retaining the rubber Stop Bumper in the Stop Housing. Holding the Tow Hook Assembly upside down and gently shaking it should be enough to cause the Rivet to fall out.

2 Remove the Stop Bumper from the Stop Housing. If necessary, use the hole located at the back end of the Stop Housing to push the Stop Bumper out.

3 Store the Stop Bumper and Rivet together.

3. Assembly Instructions

Subsequent paragraphs contain general practices and procedures for assembling subassemblies of the Tow Hook prior to installation on the aircraft. Refer to the disassembly section for required tools and equipment.

A. General Practices

These instructions contain the essential detail procedures for reassembly of detail parts and subassemblies, assemblies, and components, as applicable. Where applicable, and following each reassembly procedure, instructions are given for testing or calibrating the individual items independently. These tests determine whether the reassembled subassembly, assembly, or component is functioning properly.

B. Reassembly of the Tow Hook

(a) Bumper Stop and Rivet (Only on P/N: 6028 and 6030)

1 If already installed, remove the Rubber Spring and bushing from the Hook Housing.

2 Insert the Stop Bumper into the Stop Housing. Take care to line up the holes in the Stop Bumper with the hole in the bottom of the Hook Housing.

3 Insert the MS20426AD4-13A Rivet through the hole in the Hook Housing, Stop Housing, and Stop Bumper to secure the Stop Bumper in place.

Note: Mind that the rivet is held in place by just the Rubber Spring. Do **NOT** form the rivet head around the Stop Housing or use any other method to secure the rivet.

(b) Rubber Spring and Bushing

1 Insert the Bushing into the hole of the Rubber Spring.

2 Insert the Rubber Spring with Bushing into the Hook Housing. Orient the Rubber Spring in the Hook Housing in such a way that the back, flat side is facing towards the Release Subassembly. Refer to Figure 3.1 above for clarification.

3 Secure the Rubber Spring using an AN3-7A bolt and MS21044N3 locknut.

4 Torque the locknut 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

(c) Release Subassembly (Refer to Figure 3.1)

1 Insert the new Tow Hook Roller between the two Release Straps of the new Release Subassembly. Ensure the Release Straps holes are concentric with the hole in the Tow Hook Roller.

2 Insert the new Bushing into the Tow Hook Roller.

3 If cleaning has removed lubrication from the release subassembly, renew with grease or LPS-2.

Note: There should be enough room for slight lateral movement of the Tow Hook Roller between the Release Straps. The Bushing should also overhang the Release Straps equally on both sides.

4 Secure the Release Subassembly into the Hook Housing using the AN3-7A bolt and MS21044N3 locknut.

5 Torque the locknut 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

C. Reassembly of Tow Hook and Tow Bar to Aircraft

(1) Using the appropriate size wrench or socket, size varies depending on aircraft, attach the Tow Bar to the fuselage of the aircraft using the preexisting bolt and nut.

Note: Depending on the type of install and aircraft, the tail springs may need to be removed before the tow bar can be attached to the aircraft. For specific installs, a tail spring may be removed all together and replaced by the Tow Bar.

(2) Attach the Tow Hook Assembly to the Tow Bar using an AN8-11A Bolt, 2 AN960-816 Washers and an AN365-820 nut.

(3) Once assembled, check both the Tow Bar and Tow Hook Assembly for any loose or unsecured attachment areas.

4. Final Assembly and Testing

A. Required Parts and Tools for Final Assembly

Item No.	Part Number	Nomenclature
1	TT-T-548	Toluene
2	TT-I-735 Grade B	Isopropyl alcohol
3	MIL-P-8585TT-P-1757A	Zinc phosphate primer

B. Painting, Refinishing, Marking, and Testing

Painting, refinishing, marking, and testing the equipment is accomplished in the following paragraphs.

The Tow Hook assembly may be painted as desired. The contact surfaces of the hook will not hold paint – it will be worn off in a few uses.

Caution: The Release Subassembly, Rubber Spring, and rollers may not be painted. Excess paint or drips in the release subassembly can cause increased release loads.

(1) Painting

Any part to be painted shall be clean, dry, and treated with an etch prep. If pre-treating is not necessary, wipe clean with toluene (item 1), or xylene, to remove oil and grease. Wipe dry with clean cloth, then wipe with cloth moistened with isopropyl alcohol (item 2). Prime parts with item 3 or any two part epoxy primer. A topcoat is optional per the aircraft's Maintenance Manual.

(2) Marking

Verify the logo marking on the side of the Hook Housing is visible.

(3) Final Inspection

Visually inspect for correct assembly.

(4) Conduct the Tow Hook Functional Test on page 201 and all inspections described in the Inspection/Check section on page 501.

C. Storage

(1) Store in a clean, dry location.

D. Packaging

(1) The Tow Hook assembly and components should be packaged and wrapped to prevent damage during transport.

5. Cleaning

A. Required Tools and Equipment

Item No.	Specification No.	Nomenclature
1		Soap & water
2		Lint-free cloth
3	TT-I-735 Grade B	Isopropyl alcohol

B. Normal Cleaning

(1) Thoroughly clean the structure with soap and water using a soft cloth. Rinse off any soap residue with clean water.

Caution: Do not use harsh chemical cleaners or abrasive cleaning agents because they may damage the finish or promote corrosion.

(2) Dry with a clean, lint-free cloth immediately.

(3) Reinstall equipment.

Caution: If cleaning removes lubrication, it must be replaced, see page 305, Assembly.

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INSTALLATION AND REMOVAL

1. General

A. Consumables:

(1) Primer

(2) Paint

(3) Sandpaper

B. System Requirements

(1) The tow hook installation must be accomplished in accordance with the STC data and the pilot release mechanism must be done per FAA Advisory Circular AC43.13-2B, Chapter 8, “Glider and Banner Tow-Hitch Installations”. The PATH Release Handle Assembly, p/n 6151 provides adequate leverage and throw. Location and installation is determined by the installer.

(2) All tow hook installations must utilize an in-line pull release cable. The release cable routing must not create any side load pull on the release handle.

(3) Cord or rope is not recommended for tripping the Release Subassembly. Steel or stainless steel aircraft type control cable should be used with aircraft type MIL-spec or Nicopress swaged terminals. Reference AC43.13-1B, paragraph 132.

(4) Release cable routing in a conduit, where used, must be of sufficient size and construction. The conduit must be securely clamped to the aircraft in a manner that limits its deflection when the Release Subassembly is pulled. The clearance of the cable and/or conduit must have 1” clearance to all other systems, especially control cables and push rods, both in the relaxed state, and under release load for all deflections of the aircraft controls.

(5) If used, pulleys and fairleads must be securely attached to the aircraft. Neither the cable nor pulley may interfere with any other aircraft system or component.

(6) The release cable routing must not create excessive drag on the release cable. Housings that sweep more than a total of 270 degrees from adding each bend together may have excess friction.

(7) The pilot release mechanism in the cockpit must be designed in such a way to provide sufficient leverage to release the towline when under a high load. The tow hook release must not be operated by pulling a rope or cable by hand for any towing. It is essential that the system includes a pilot operated release mechanism with a leverage ratio that ensures adequate release force will be applied to the tow hook during an emergency release situation at adverse tow angles.

(8) The pilot release mechanism must be designed to prevent any accidental release of the tow hook.

(9) The Pacific Aerial Tow Ring, P/N: 6131, must not be modified in any way. The Pacific Aerial Tow Hook Assemblies were designed for use with only the Pacific

Aerial Tow Ring. The Pacific Aerial Tow Ring has a 2.25 inch outer diameter with a 0.25 inch cross section and has been forged, heat treated, and proof loaded. Do not use any other tow ring. Use of a different tow ring may cause the tow ring to jam or a failure to release the tow load.

C. Placard Requirements

Install placards as per AC43.13-2B, Section 807.

D. “Weld On” Style Tow Hook Installation

Pacific Aerial offers two variants of the “Weld On” Tow Hook assembly, P/N: 6027 and P/N: 6028. See Figures 4.1 and 4.2 respectively. P/N: 6028, comes with the additional Bumper Stop which prevents the Hook from striking the Hook Housing upon releasing the tow load.

Warning: The PATH tow hooks have not been evaluated or approved to be used on gliders as a tow release. The installer must determine the suitability of the tow hook design and installation before using these tow hooks for any other purpose. It may be installed on the aircraft used for glider or banner towing or hand propping (ground use.)

Weight of the P/N: 6027 Tow Hook is ≈ 0.355 lbs.
Weight of the P/N: 6028 Tow Hook is ≈ 0.425 lbs.

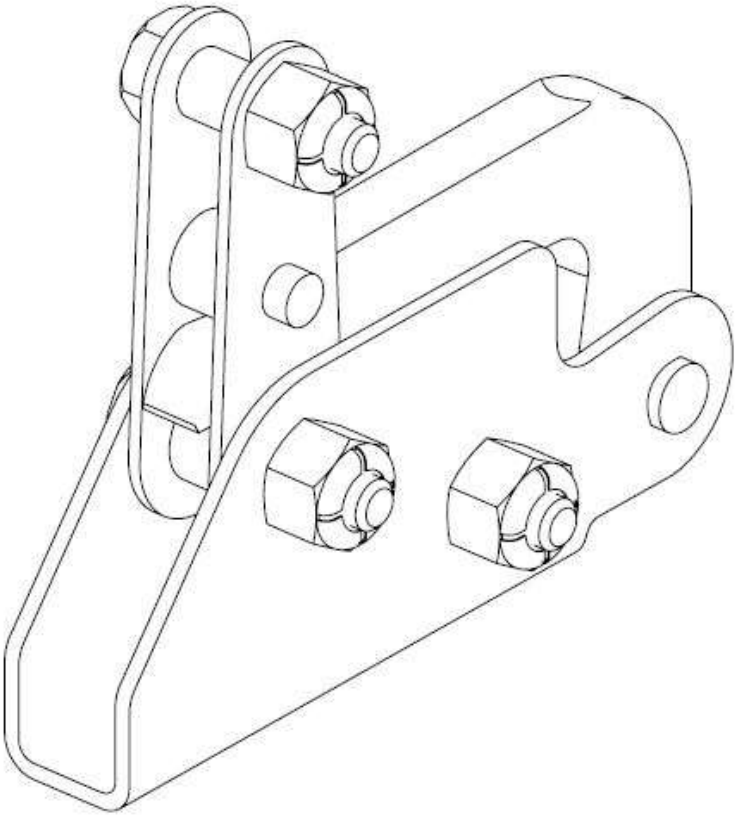

Figure 4.1: “Weld On” Tow Hook Assembly, P/N: 6027

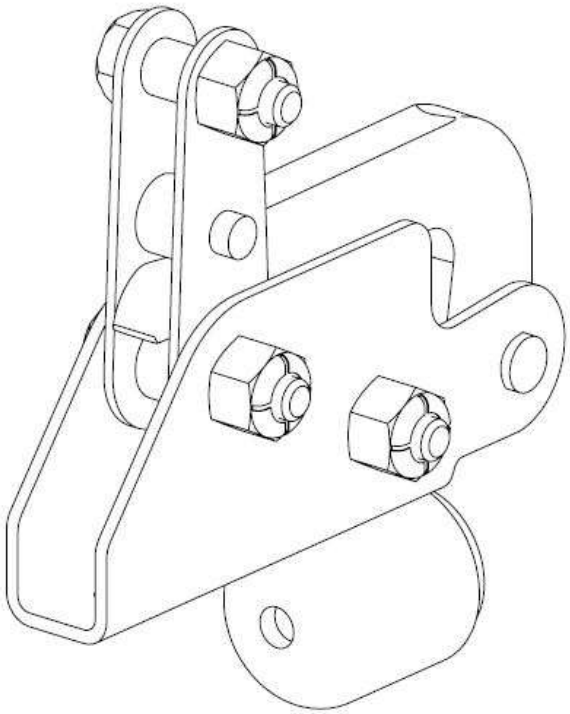

Figure 4.2: “Weld On” Tow Hook Assembly with Optional Bumper Stop, P/N: 6028

(1) Before welding the Tow Hook Assembly to the Tow Bar, remove the bolts, locknuts, Rubber Spring, Release Subassembly, Rivet (if using P/N: 6028), and Stop Bumper (if using P/N: 6028), to prevent any damage caused by the welding process.

(2) To insure a satisfactory weld, remove the black oxide coating from the area of the Hook Housing to be welded. It is recommended to use sandpaper to remove the black oxide coating. Avoid the use of a grinder or powered belt sander as removing excessive material will weaken the assembly. Only remove as much material as necessary for a proper weld.

(3) Using sandpaper, carefully sand the area of the Tow Bar which will be welded. Avoid the use of a grinder or powered belt sander as removing excessive material will weaken the assembly. Only remove as much material as necessary for a proper weld.

(4) The Tow Hook Pivot Pin is retained with silver braze. Avoid welding in such a way as to cause excess heat to hit the Tow Hook Pivot Pin. Excessive heat due to the welding process may weaken or cause damage to the braze joint.

(5) The Hook should also be protected from any excess heat during the welding process.

(6) Carefully weld the Tow Hook Assembly onto the Tow Bar.

(7) After welding, verify that the Tow Hook Assembly is securely attached to the Tow Bar.

(8) Once securely attached, clean and paint the Tow Hook Assembly with a high quality primer and paint. The thickness of the paint layer should be kept to a minimum so as to not inhibit operation and/or movement of the Hook or Release Subassembly.

(9) Reattach the Release Subassembly, Rubber Spring, Stop Bumper (if using P/N: 6028), Rivet (if using P/N: 6028), bolts and locknuts. Torque the locknuts 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

E. "Bolt On" Style Tow Hook Installation

Pacific Aerial offers two variants of the "Bolt On" Tow Hook assembly, P/N: 6029 and P/N: 6030. See Figures 4.3 and 4.4 respectively. P/N: 6030, comes with the additional Bumper Stop which prevents the Hook from striking the Hook Housing upon releasing the tow load.

Warning: The Tow Hook assembly is NOT to be installed onto a glider. It can be installed on the aircraft used for glider or banner towing or hand propping (ground use)

Weight of the P/N: 6029 Tow Hook is ≈ 0.507 lbs.
Weight of the P/N: 6030 Tow Hook is ≈ 0.537 lbs.

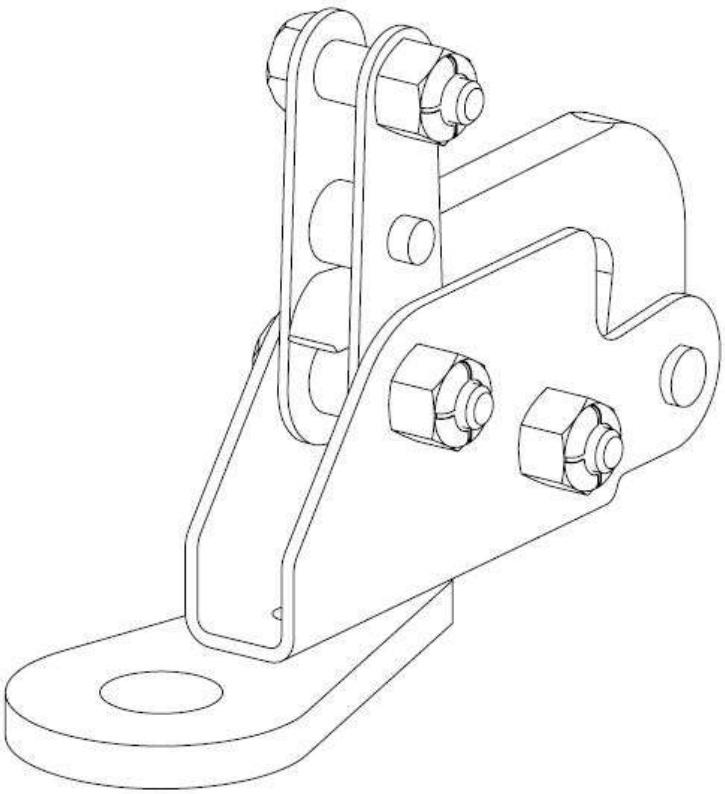

Figure 4.3: "Bolt On" Tow Hook Assembly, P/N: 6029

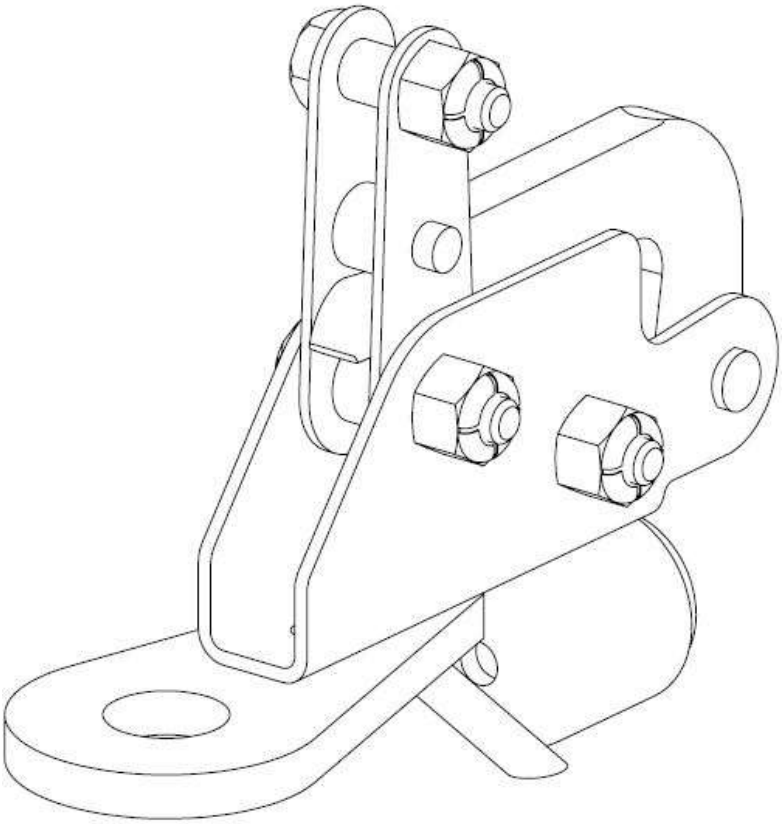

Figure 4.4: “Bolt On” Tow Hook Assembly with Optional Bumper Stop, P/N: 6030

(1) Both the 6029 and 6030 Tow Hook Assemblies come with a mounting lug welded onto the assembly that allows the Tow Hook to be bolted onto the Tow Bar

(2) Many aircraft use the tail tie-down mounting point to take advantage of pre-existing structural reinforcement of the tail tie-down.

(3) Bolt the Tow Hook assembly onto the Tow Bar using an AN8-11A Bolt, two AN960-816 washer, and AN365-820 Locknut. If not using a PATH Tow Bar, a Bushing or Spacer may need to be fabricated and placed in the mounting lug.

(4) After bolting the Tow Hook Assembly onto the aircraft, verify the assembly is securely in place. The tow hook must not swivel on the tie-down bolt or the spacer.

F. Installation of Tow Bar onto Aircraft

(1) Piper Models J-3, J-4, J-5, PA-11, PA-12, PA-18, PA-18A, and PA-25. Refer to Figure 4.5 for clarification.

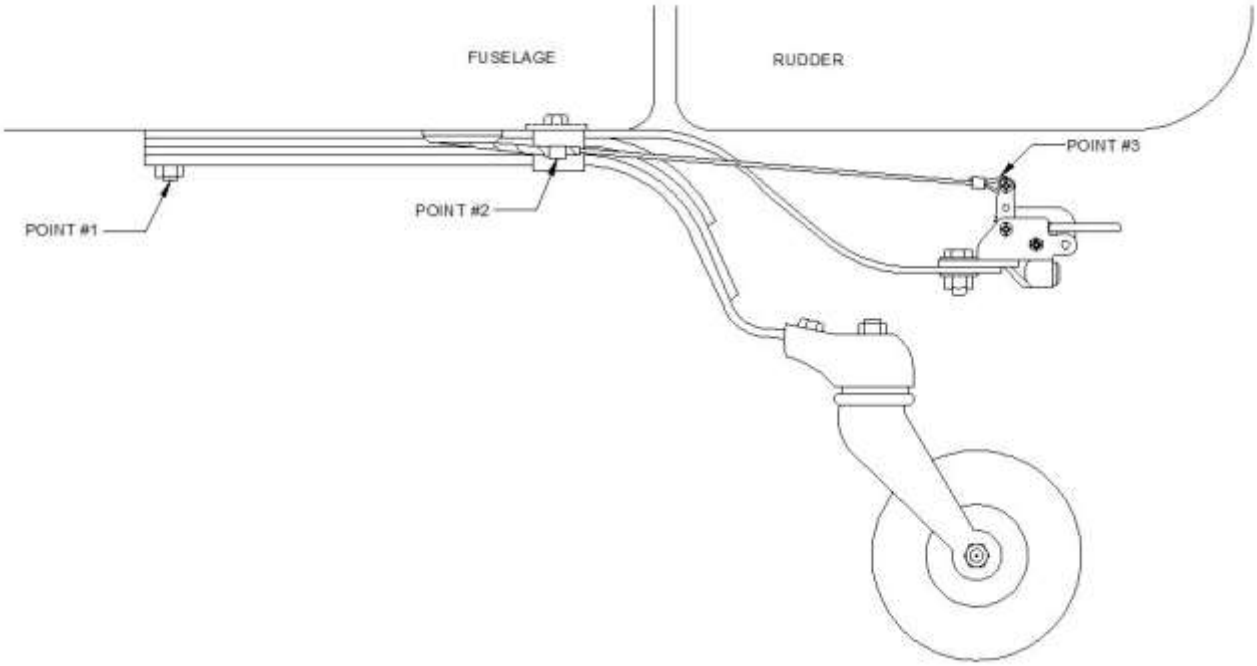

Figure 4.5: Tow Hook Installation on Piper Models J-3, J-4, J-5, PA-11, PA-12, PA-18, PA-18A, and PA-25.

(a) Place a jack underneath the aircraft to relieve weight from the Tailwheel.

(b) Remove the nut securing the tail springs at Point #1.

(c) Remove the spring clamp at Point #2.

(d) Place the Tow Bar on top of the tail springs and replace the nut and spring clamp.

(e) Install grommet in fuselage.

(f) Attach the Aircraft Cable and Thimble, to the Tow Hook Assembly at Point #3. Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

(g) Secure the Nylaflow Tubing to Point #2 with a MS21919DG-4 Adel Clamp.

(h) Route the Aircraft Cable and Nylaflow Tubing through the grommet and fuselage to the cockpit. Secure the Nylaflow Tubing every 24” to insure clearance from any control cables.

(2) Piper Models PA-22, and Colt-108. Refer to Figure 4.6 for clarification.

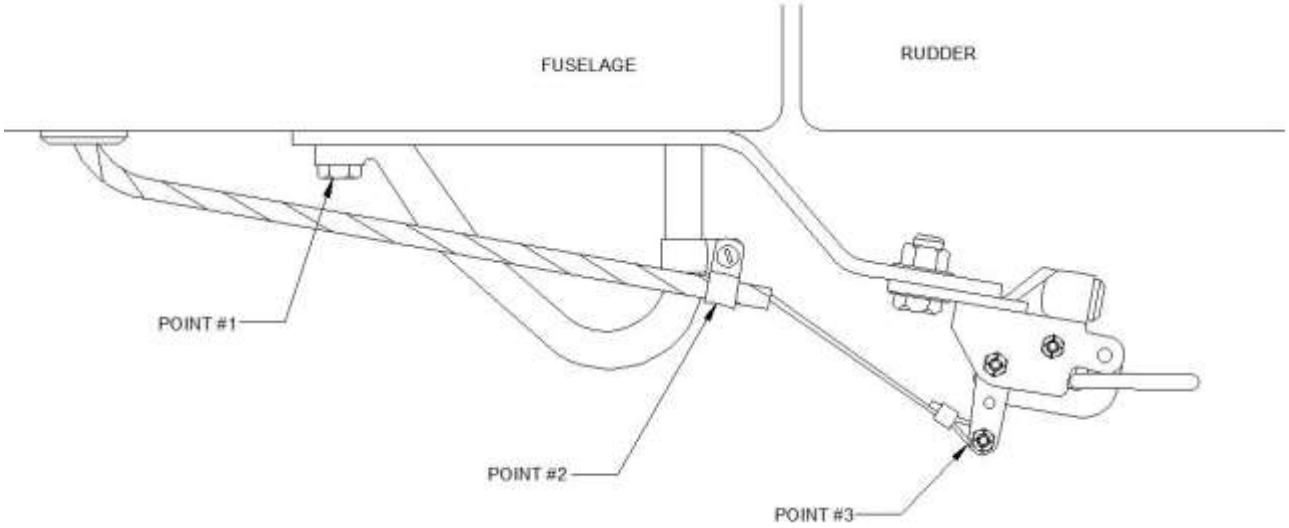

Figure 4.6: Tow Hook Installation on Piper Models PA-22, and Colt-108.

(a) Place tail of aircraft on a jack to relieve weight.

(b) Remove 3/8 nut at Point #1 and remove tail skid.

(c) Place the Tow Bar between the tail skid and fuselage. Secure with the 3/8 nut.

(d) Install grommet in fuselage.

(e) Attach the Aircraft Cable and Thimble, to the Tow Hook Assembly at Point #3. Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

(f) Secure the Nylaflow Tubing to the tail skid by installing MS21919DG-8 and MS21919DG-4 Adel Clamps on aft end of tail skid at Point #2.

(g) Pass the Aircraft Cable and Nylaflow Tubing through the grommet and fuselage to the cockpit. Secure the Nylaflow Tubing every 24” and insure clearance from any control cables.

(3) Cessna Models 170, 170A, and 170B. Refer to Figure 4.7 for clarification.

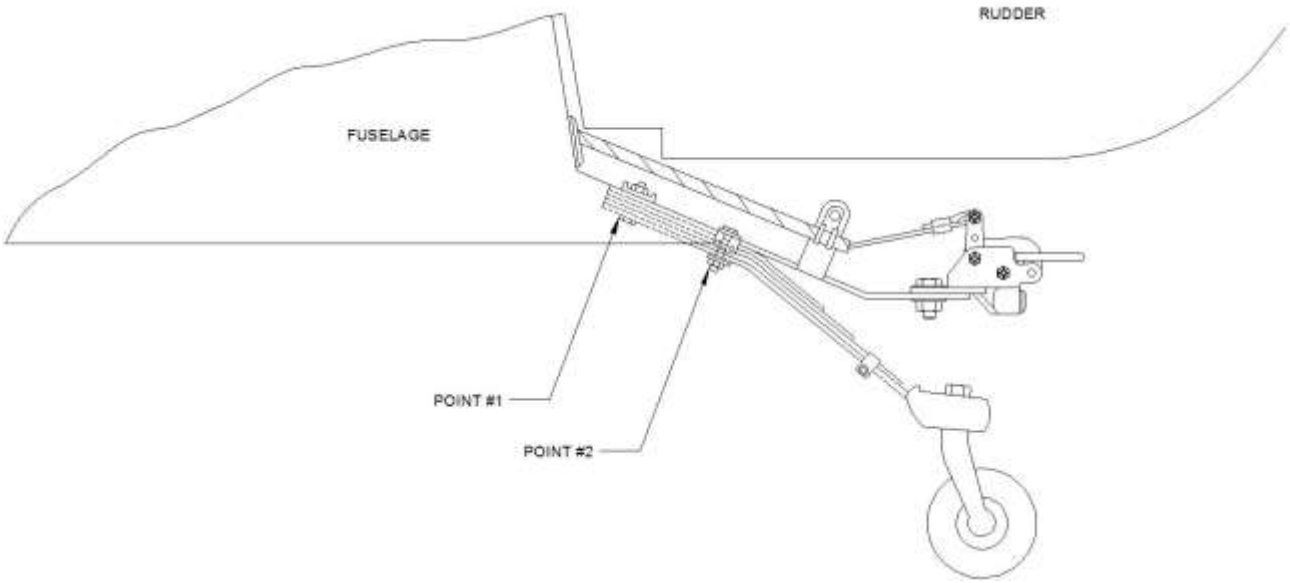

Figure 4.7: Tow Hook Installation on Cessna Models 170, 170A, and 170B.

(a) Place tail of aircraft on jack to relieve weight and clear tail assembly.

(b) Remove spring clamp at Point #2.

(c) Remove 5/16 Bolt at Point #1 and remove top leaf spring.

(d) Place Tow Bar on top of springs as shown above and secure at Point #1 with 5/16 Bolt.

(e) Replace spring clamp at Point #2.

(f) Install grommet in aft end of fuselage.

(g) Run Nylaflow Tubing and Aircraft Cable through the grommet and fuselage to the cockpit. Secure the Nylaflow Tubing every 24” and insure clearance from any control cables.

(h) Attach the Aircraft Cable and Thimble, to the Tow Hook Assembly. Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

(4) Cessna Models 150, 172, 175, 182, 205, and 210. Refer to Figure 4.8 for clarification.

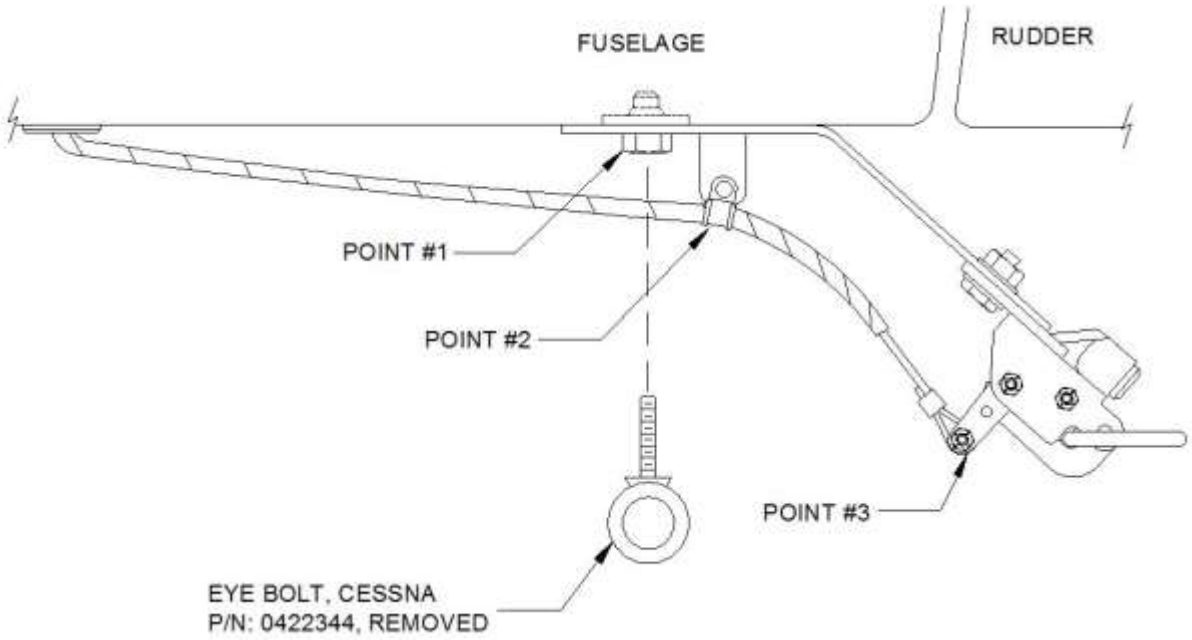

Figure 4.8: Tow Hook Installation on Cessna Models 150, 172, 175, 182, 205, and 210.

(a) Place tail of aircraft on jack to relieve weight.

(b) Remove Eyebolt, Cessna P/N: 0422344 at Point #1.

(c) Attach Tow Bar to Point #1 with AN5-13A Bolt.

(d) Install grommet in fuselage.

(e) Pass Aircraft Cable and Nylaflow Tubing through grommet and fuselage to cockpit. Secure the Nylaflow Tubing every 24” to insure clearance from any control cables.

(f) Clamp Nylaflow Tubing to Tow Bar at Point #2 with Adel Clamp.

(g) Attach Aircraft Cable and Thimble to Tow Hook Assembly at Point #3.

(h) Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

(5) Boeing A75. Refer to Figure 4.9 for clarification.

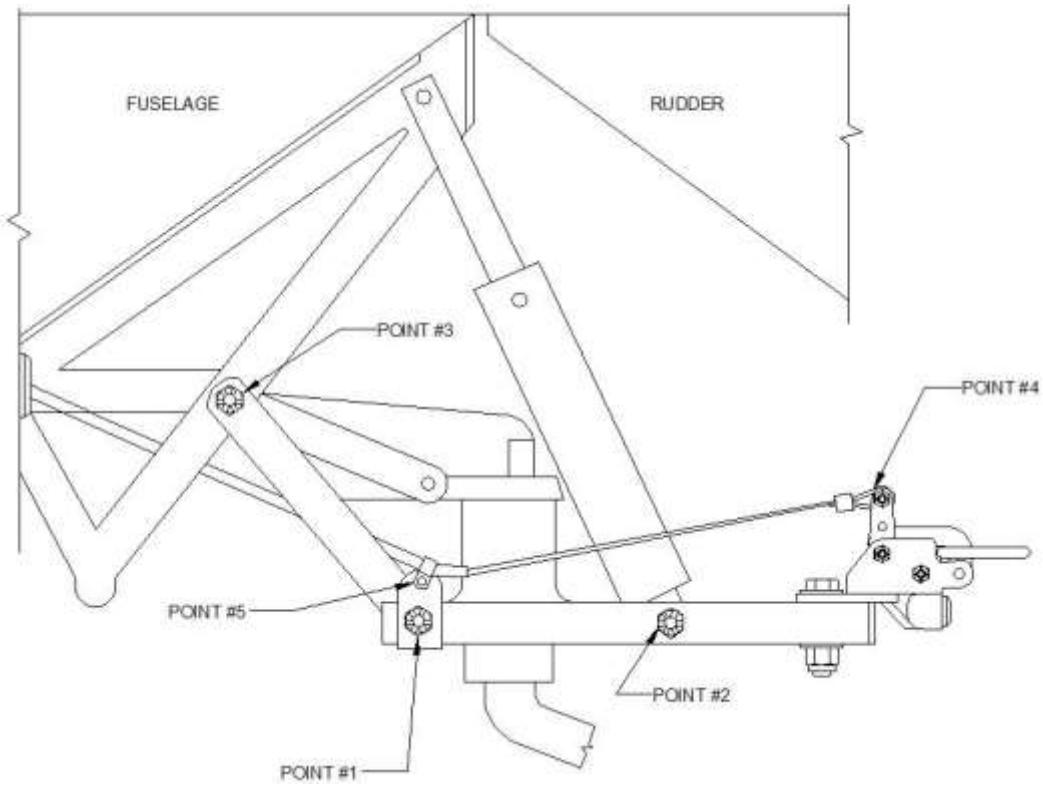

Figure 4.9: Tow Hook Installation on Boeing A75

(a) Place tail of aircraft on jack to relieve weight and remove tail cone.

(b) Remove bolts at tail wheel post, Points #1 and #2.

(c) Remove bolts on both sides of tail section at cluster of Longeron at Point #3.

(d) Place Tow Bar on tail wheel post and shock strut.

(e) Secure Tow Bar to tail wheel post and shock strut with AN5-50 Bolt, AN960-516 Washer, AN310-5 Nut and AN380-2 Cotter Pin.

(f) Place Brace on Tow Bar at Point #1 and Longeron Cluster Point #3. Secure by reinstalling bolts at Point #3.

(g) Install Bracket at Point #1 with AN5-60 Bolt.

(h) Install grommet in fuselage.

(i) Route Nylaflow Tubing and Aircraft Cable through grommet and fuselage to cockpit. Secure the Nylaflow Tubing every 24” to insure clearance from any control cables.

(j) Clamp Nylaflow Tubing to Bracket at Point #5.

(k) Attach Aircraft Cable and Thimble to Tow Hook Assembly at Point #4.

(l) Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

(6) Aeronca Models 7AC, 15AC, 7BCM, 7DC, and 7GCA. Refer to Figure 4.10 for clarification.

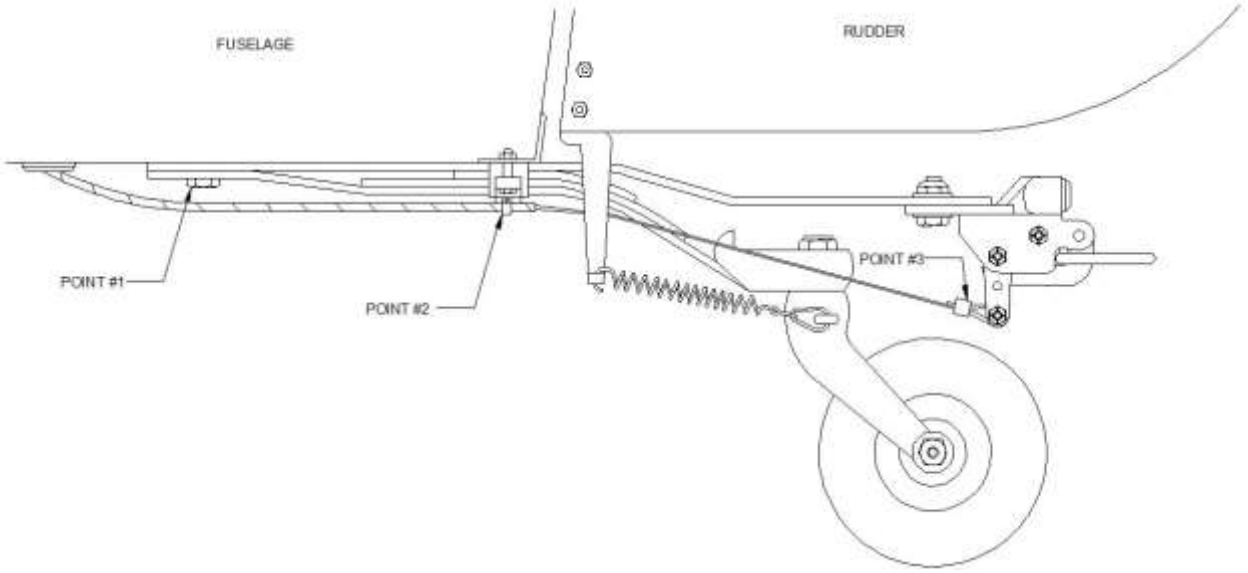

Figure 4.10: Tow Hook Installation on Aeronca Models 7AC, 15AC, 7BCM, 7DC, and 7GCA.

(a) Place tail of aircraft on jack to relieve weight.

(b) Remove preexisting bolt at Point #1 and tail spring clamp at Point #2.

(c) Place Tow Bar atop Tail Springs and reinstall bolt and tail spring clamp.

(d) Install grommet in fuselage.

(e) Route Nylaflow Tubing and Aircraft Cable through grommet and fuselage to cockpit. Secure the Nylaflow Tubing every 24” to insure clearance from any control cables.

(f) Clamp Nylaflow Tubing to Point #2 with Adel Clamp.

(g) Attach Aircraft Cable and Thimble to Tow Hook Assembly at Point #3.

(h) Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

(7) Cessna Models 180 and 185. Refer to Figure 4.11 for clarification.

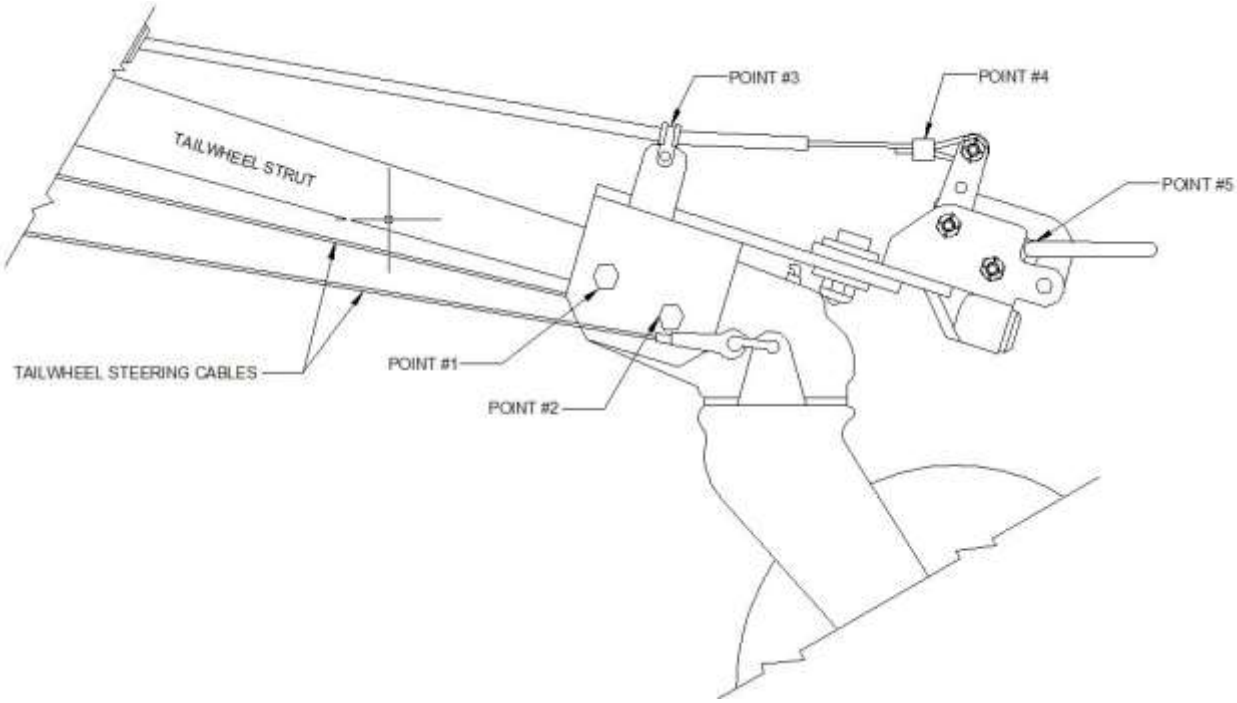

Figure 4.11: Tow Hook Installation on Cessna Models 180 and 185.

(a) Place tail of aircraft on jack to relieve weight.

(b) Remove preexisting AN5-21A Bolt at Point #1.

(c) Remove preexisting AN5-26A Bolt at Point #2.

(d) Position Tow Bar on tailwheel assembly.

(e) Secure Tow Bar to tailwheel assembly with AN5-3A Bolts at Points #1 and #2.

(f) Install grommet in fuselage.

(g) Route Nylaflow Tubing and Aircraft Cable through grommet and fuselage to cockpit. Secure the Nylaflow Tubing every 24” to insure clearance from any control cables.

(h) Secure Nylaflow Tubing at Point #3 with Adel Clamp.

(i) Attach Aircraft Cable and Thimble to Tow Hook Assembly at Point #4.

(j) Secure the aircraft cable with a Nicopress Sleeve. Swage the Nicopress Sleeve per AC43.13-1B Chapter 7-148.

G. Post Tow Hook Installation

(1) Test the installation for safe, smooth, and free operation,

(2) Complete the Tow Hook Functional Test on page 201.

(3) Complete the Pre-Flight inspection on page 501.

(4) Complete the A Phase Inspection on page 503.

H. Removal of the Tow Hook System

(1) Tow Bars

(a) For the Tow Bar Assemblies, removal of the Tow Bar is accomplished by following the installation procedures in reverse order.

(2) “Bolt On” Tow Hooks

(a) For the “Bolt On” Tow Hook assemblies, removal of the Tow Hook is accomplished by following the installation procedures in reverse order.

(b) The operator may also choose to completely remove the Tow Bar from the tow plane. This is accomplished by removing the nuts and bolts securing the Tow Bar to the aircraft.

(3) “Weld On” Tow Hooks

(a) For the “Weld On” Tow Hook assemblies, the Tow Bar itself must be removed. This is accomplished by removing the nuts and bolts securing the Tow Bar to the aircraft.

INSPECTION/CHECK

Note: This section defines specific wear and damage to be checked for each component.

2. Scheduled inspections

Note: There is no life limit on the Pacific Aerial Tow Hook assembly or Tow Bar. The Hook or components should be replaced when they do not pass the following inspections.

A. Pre Flight Inspection

(1) Tow Hook Assembly

1 Verify the Tow Hook Assembly is securely mounted to the tow bar.

2 Verify the Tow Hook Assembly has no loose or missing fasteners.

3 Verify the Tow Hook Assembly is free from cracks of any size.

4 Verify the Tow Hook Assembly has no signs of distortion.

5 Verify that both the Release Subassembly and the Hook are able to pivot smoothly throughout their full range of travel.

6 Verify that both the Release Subassembly and the Hook are able to rotate freely and do not bind at any pivot points.

7 Verify the Hook does not contact the rudder or any other aircraft structure over its full range of movement.

8 Verify the Rubber Spring has sufficient force to maintain engagement of the Hook into the Release Subassembly.

9 Verify the Rubber Spring is not excessively hard. The hardness of the Rubber Spring should be slightly less than a standard car tire.

10 Verify the Rubber Spring has no permanent indentation caused by the Hook or Tow Ring.

11 If installed, verify the Stop Bumper is intact and secure. It should show no signs of weathering or missing components.

12 If installed, verify the Stop Bumper is able to prevent the Hook from striking any part of the Hook Housing frame.

13 Verify that the Tow Hook Assembly passes the Functional Test described on page 201.

(2) Tow Ring Inspection

1 Verify the Tow Ring is free from any distortion.

2 Verify the Tow Ring being used is a Pacific Aerial Tow Ring, P/N: 6131. The Tow Ring should have a 2.25 inch outer diameter and a 0.25 inch diameter cross section, see Figure 5.1. The Tow Ring is also forged, heat treated, and proof loaded.

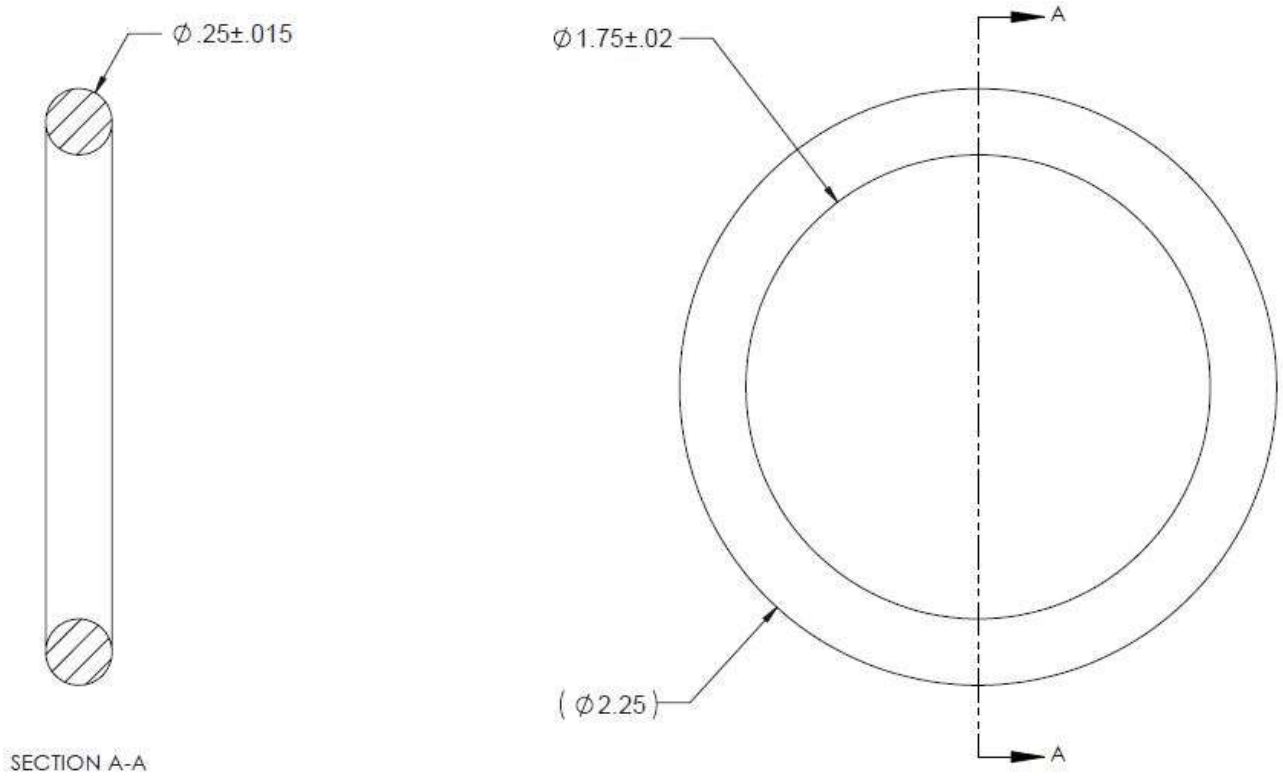

Figure 5.1: Pacific Aerial Tow Ring, P/N: 6131

If any of the above are found defective, correct the defect or replace the tow hook assembly prior to use.

(3) Tow Bar

1 Verify the Tow Bar is securely mounted to the aircraft.

2 Verify the Tow Bar has no loose or missing fasteners.

3 Verify the Tow Bar is free from cracks of any size. If cracks are suspected, perform a dye penetrant inspection on the suspected area. If any crack is found, the Tow Bar must be removed from service.

4 Inspect the weld points of the Tow Bar (depends on Tow Bar). If any damage is found, the Tow Bar must be removed from service.

5 Verify the Tow Bar has no major signs of bending or distortion.

If any of the above are found defective, correct the defect or replace the tow bar prior to use.

B. A-Phase Inspection – inspection to coincide with the airframe inspection and suspected tow hook overload inspection. If no phase inspection is followed, inspect every 100 hours.

Perform the operational Pre Flight Inspections on page 501 and the following inspections:

1 Check security and condition of Rubber Spring.

2 Check all pivot points for excess play or looseness of fasteners.

3 Inspect the base weld assembly for any cracks using a 10X magnifying lens. If any cracks are suspected, perform a dye penetrant inspection on the suspected area. If any crack is found, the Tow Hook assembly must be removed from service.

4 Inspect the silver braze joint at the Tow Hook Pivot Pin for cracks using a 10X magnifying lens. If cracks are suspected, perform a dye penetrant inspection on the suspected area. If any crack is found, the Tow Hook assembly must be removed from service.

5 Inspect the Release Subassembly rivet for condition and security.

6 Inspect the Release Subassembly roller for operation. The roller must rotate freely with little effort. Clean and lubricate the roller as required.

7 Inspect the Release Cable attachment point on the Release Subassembly for security and excess wear.

8 Inspect the Hook for any excess wear caused by the Tow Ring.

9 Measure the “No Load” release effort with a tow ring installed in the hook and verify that it meets the release effort specification listed on page 201.

10 Verify that the arc traveled by the Hook, when released, completely clears all parts of the aircraft.

Warning: The Tow Hook has tremendous kinetic energy when released under load. To avoid damage to the aircraft or jamming the flight controls, it is essential that the Hook does not contact any aircraft structure or control surface when released. Ensure the Hook travel arc has clearance with all control surfaces in all positions throughout the full range of travel.

11 If a Tow Hook overload is suspected to have occurred, inspect the aircraft structure for damage caused by the overload.

12 Inspect the Tow Bar for any excess signs of wear.

13 Inspect the Tow Bar for cracks of any size. If cracks are suspected, perform a dye penetrant inspection on the suspected area. If any crack is found, the Tow Bar must be removed from service.

14 Inspect the weld points of the Tow Bar (depends on Tow Bar). If any damage is found, the Tow Bar must be removed from service.

15 Verify the Tow Bar has no major signs of bending or distortion.

16 Check cockpit placard. The placard must show structural design limits of the tow system and must be conspicuous and easily readable by the pilot.

If any of the above are found defective, correct the defect or replace the tow hook assembly prior to use.

REPAIRS

A. Required Tools and Equipment

Item No.	Nomenclature	Specification No.
1	10X magnifying lens	
2	Dye penetrant	
3	4130N alloy steel sheet	AMS 6345 or MIL-S-6345
4	Torque wrench	

B. Tow Hook Assembly and Components

(1) The Hook, Tow Ring, or any other components must be replaced when they do not pass the inspections on page 501. If any cracks are suspected to have formed, inspect the area with a 10X magnifying lens (item 1) and perform a thorough inspection on the suspected area with dye penetrant (item 2). If a crack of any size is found, the Tow Hook assembly must be removed from service or returned to Fliegen Works Inc. for repairs.

C. Hook Housing

(1) For Tow Hook assemblies that are not equipped with the optional Bumper Stop, P/Ns: 6027 and 6029, it is common for the Hook to strike the Hook Housing frame upon release of the load. Due to the tremendous kinetic energy, repeated releases will cause the Hook to eventually dig into the Hook Housing. To prevent any cracks from forming on the Hook or Hook Housing, many aircraft towing operators will weld a small strap of steel across the impact area to repair any damage and provide increased area for the Hook to contact.

Follow the FAA guidelines stated in AC43.13-1B for welding the Steel Strap onto the Hook Housing.

(a) Steel Strap

1 Fabricate a strap of the same steel (item 3) to cover the area where the Hook will strike the Hook Housing.

2 Before welding the strap onto the Hook Housing, remove the bolts, locknuts, Rubber Spring and Release Subassembly to prevent any damage caused by the welding process.

3 Carefully weld the strap onto the Hook Housing.

4 To insure a satisfactory weld, remove the black oxide coating from the area of the Hook Housing to be welded. It is recommended to use sandpaper to remove the black oxide coating. Avoid the use of a grinder or powered belt sander as removing excessive material will weaken the assembly. Only remove as much material as necessary for a proper weld.

6 The Tow Hook Pivot Pin is retained with silver braze. Avoid welding in such a way as to cause excess heat to hit the Tow Hook Pivot Pin. Excessive heat due to the welding process may weaken or cause damage to the braze joint.

7 The Hook should also be protected from any excess heat during the welding process.

8 Carefully weld the fabricated strap onto the Hook Housing.

9 After welding, verify that the strap is securely attached to the Hook Housing.

10 Once securely attached, clean and paint the Tow Hook Assembly with a high quality primer and paint. The thickness of the paint layer should be kept to a minimum so as to not inhibit operation and/or movement of the Hook or Release Subassembly.

11 Conduct the Functional Test described on page 201 and the inspections described on page 501.

D. Rubber Spring

(1) If the Rubber Spring, P/N: 6017, becomes damaged in any way, the Tow Hook Assembly must be removed from service until a replacement spring can be purchased from Fliegen Works Inc. Do not attempt to repair the Rubber Spring in any way.

(2) Remove the AN3-7A bolt and MS21044N3 locknut holding the Rubber Spring in the Tow Hook Assembly.

(3) Remove the Rubber Spring from the Tow Hook Assembly.

(4) Remove the Bushing located in the hole of the Rubber Spring.

(5) Check the Bushing for any excessive signs of wear.

(6) Replace the Bushing into the hole of the replacement Rubber Spring.

(7) Replace the new Rubber Spring with Bushing into the Tow Hook Assembly and secure using the AN3-7A bolt and MS21044N3 locknut.

(8) Torque the locknut 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

(9) After replacing the Rubber Spring, conduct the No Load Release Test described on page 201.

(10) If the repaired Tow Hook Assembly requires a release force higher than 4-10 lbs. carefully trim the top of the Rubber Spring, and redo the test. Repeat as necessary to reduce release force.

(11) Perform the Tow Ring Clearance Test described on page 205.

E. Bushing

(1) If the Bushing, P/N: 6014, in the Rubber Spring becomes damaged in any way, The Tow Hook Assembly must be removed from service until a replacement Bushing can be purchased from Fliegen Works Inc. Do not attempt to repair the Bushing in any way.

(2) Remove the AN3-7A bolt and MS21044N3 locknut holding the Rubber Spring in the Tow Hook Assembly.

(3) Remove the Rubber Spring from the Tow Hook Assembly.

(4) Remove the Bushing located in the hole of the Rubber Spring.

(5) Insert the new Bushing into the hole of the Rubber Spring.

(6) Insert the Rubber Spring with Bushing back into the Hook Housing.

(7) Secure the Rubber Spring in place using the AN3-7A bolt and MS21044N3 locknut.

(8) Torque the locknut 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

F. Release Subassembly

(1) If any part of the Release Subassembly has been cracked or damaged, the Tow Hook Assembly must be removed from service until a replacement Subassembly can be purchased from Fliegen Works Inc. Do not attempt to repair the Release Subassembly in any way.

(2) Remove the AN3-7A bolt and MS21044N3 locknut securing the Release Subassembly to the Tow Hook Assembly.

(3) Remove the damaged Release Subassembly from the Tow Hook Assembly.

(4) Insert the new Tow Hook Roller between the two Release Straps of the new Release Subassembly. Refer to Figure 6.1 for clarification. Ensure the Release Straps holes are concentric with the hole in the Tow Hook Roller.

(5) Insert the new Bushing into the Tow Hook Roller. Refer to Figure 6.2 for clarification.

Note: There should be enough room for slight lateral movement of the Tow Hook Roller between the Release Straps. The Bushing should also overhang the Release Straps equally on both sides.

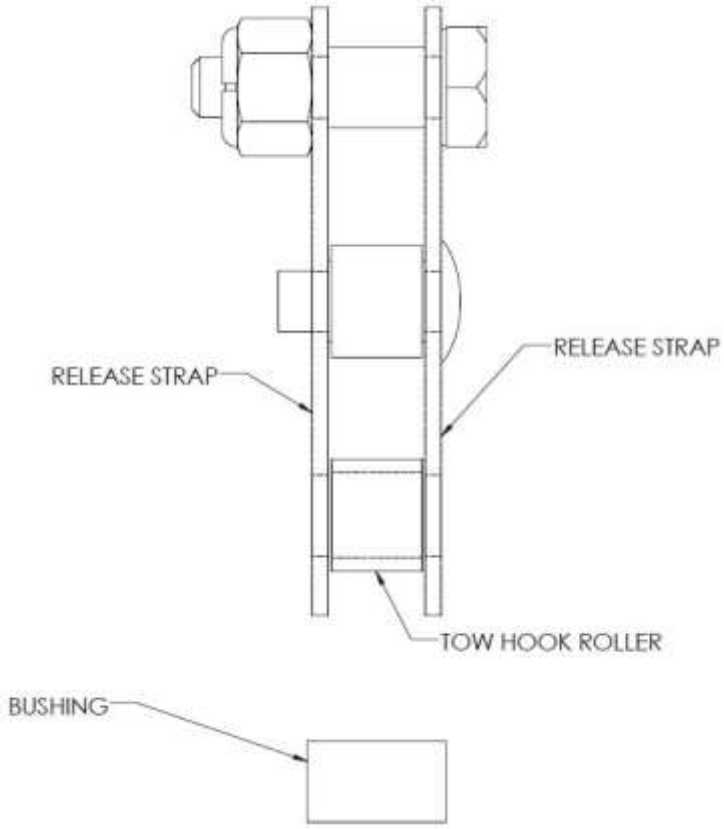

Figure 6.1: Release Subassembly with Tow Hook Roller in place.

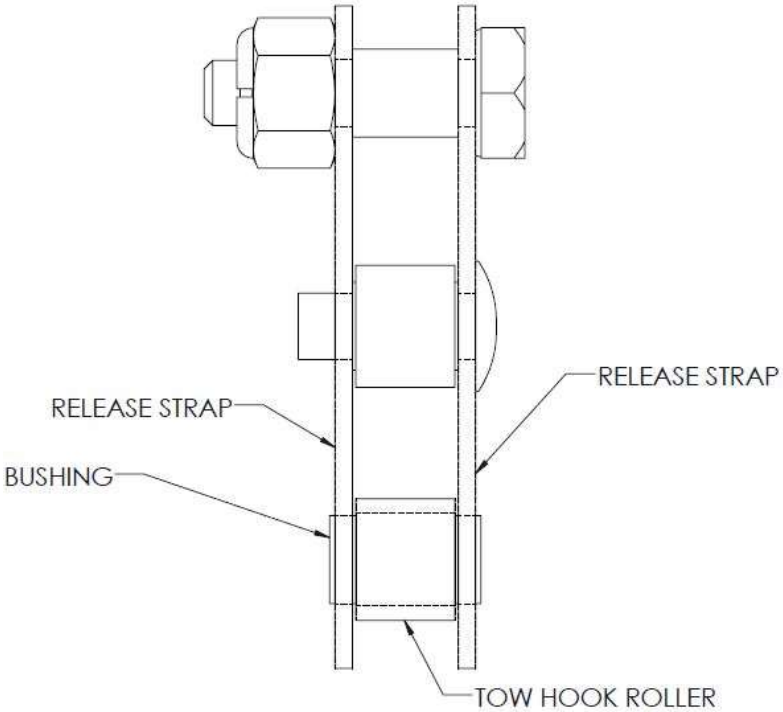

Figure 6.2: Release Subassembly with Tow Hook Roller and Bushing in place.

(6) Secure the Release Subassembly into the Hook Housing using the AN3-7A bolt and MS21044N3 locknut.

(7) Torque the locknut 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

(8) Conduct the No Load Release Test described on page 201.

(9) If the repaired Tow Hook Assembly requires a release force higher than 4-10 lbs. carefully trim the top and bottom of the Rubber Spring, and redo the test. Repeat as necessary to reduce release force.

(10) Perform the Tow Ring Clearance Test described on page 205.

G. Stop Bumper (Optional, only on P/Ns 6028 and 6030)

(1) If the Stop Bumper has been damaged in any way which causes the Hook to strike either the Hook Housing or Stop Housing, the Tow Hook Assembly should be removed from service until a replacement Stop Bumper can be purchased from Fliegen Works Inc.

(2) Remove the AN3-7A bolt and MS21044N3 locknut securing the Rubber Spring in place.

(3) Remove the Rubber Spring from the Tow Hook Assembly.

(4) Remove the Rivet, 6049, securing the Stop Bumper in the Stop Housing.

Note: The Rivet is held in place only by the Rubber Spring. The Rivet should be able to fall out on its own without excessive force.

(5) Remove the damaged Stop Bumper from the Stop Housing. If necessary, utilize the hole located on the rear of the Stop Housing to push the Bumper out.

(6) Insert the new Stop Bumper into the housing. Take care to line up the holes in the Stop Bumper, Stop Housing, and Hook Housing.

(7) Reinsert the Rivet through the hole in the Hook Housing to secure the Stop Bumper in place.

Note: Do NOT form the rivet head around the Stop Housing or use any other method to secure the rivet.

(8) Reinsert the Rubber Spring into the Tow Hook Assembly and secure using the AN3-7A bolt and MS21044N3 locknut.

(9) Torque the locknut 20-25 inch-pounds. Refer to Figure 7.2 on page 704.

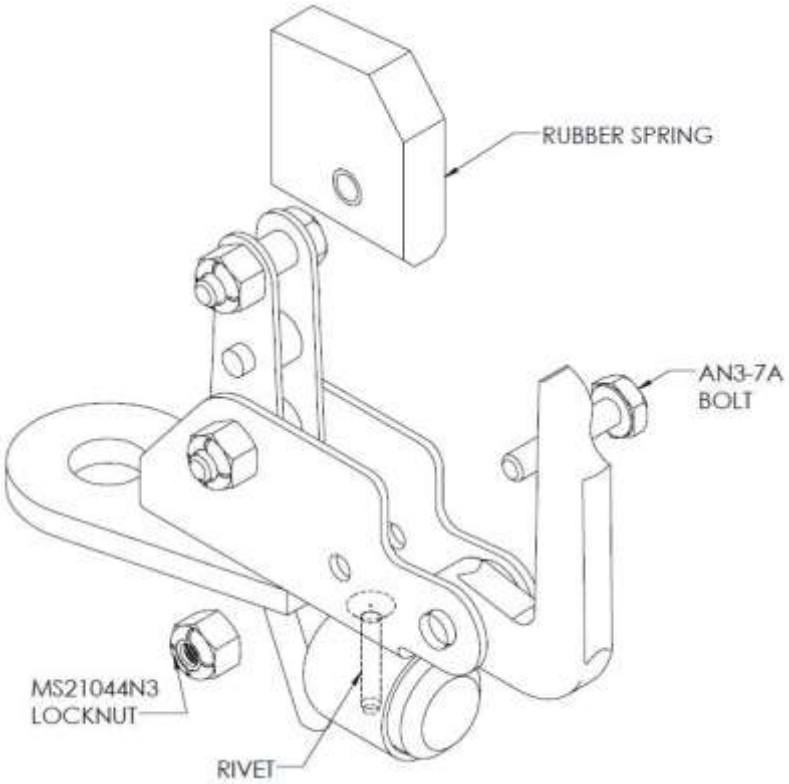

Figure 6.3: Tow Hook Assembly with Rivet in place.

H. Components requiring complete replacement of Tow Hook Assembly

(1) If cracks or any damage is detected on the following parts, the Tow Hook Assembly must be removed from service and a new Tow Hook Assembly must be purchased from Fliegen Works Inc. **REPAIRS ON THE FOLLOWING COMPONENTS ARE NOT ALLOWED.** Refer to Figure 6.4 below.

(a) P/N: 6018 – Pivot Pin; Tow Hook

(b) P/N: 6019 – Hook

(c) P/N: 6020 – Hook Housing

(d) P/N: 6021 – Lug (Optional, only on P/Ns 6029 and 6030)

(e) P/N: 6055 – Stop Housing (Optional, only on P/Ns 6028 and 6030)

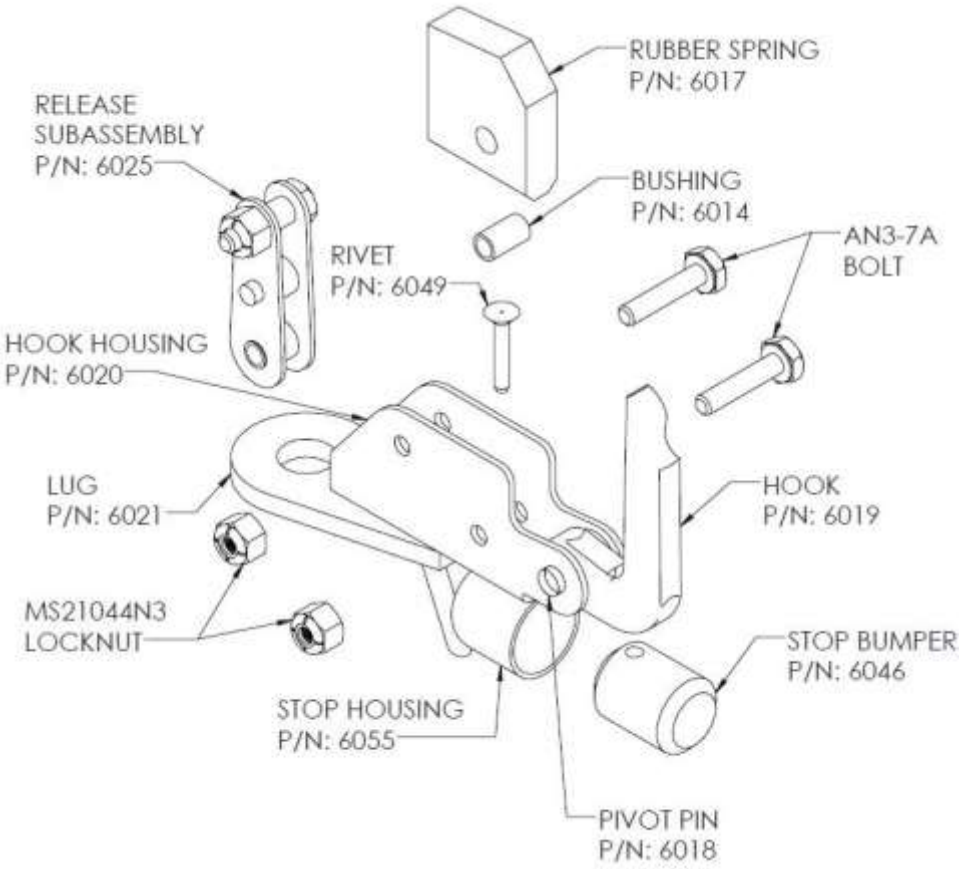

Figure 6.4: Tow Hook/Lug with Stop Exploded View, P/N: 6030

I. Tow Bar (P/Ns 1201, 1211, 1221, 1242, 1252, 1259, 1262, 1271, 1281, 1291)

(1) The Tow Bar must be replaced when they do not pass the inspections on page 503. If any cracks are suspected to have formed, inspect the area with a 10X magnifying lens (item 1) and perform a thorough inspection on the suspected area with dye penetrant (item 2). If a crack of any size is found, the Tow Bar must be removed from service or returned to Fliegen Works Inc. for repairs.

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FITS AND CLEARANCES

1. General

This section contains all fits and clearances and torque values used in assembly, including permissible “in-service/service wear”, and manufacturers design wear tolerances.

2. Fastener Fits

The following table presents the size limitations for various fasteners/parts holes.

Fastener/Part Identification	Nomenclature	Hole Size	Preferred Drill Size
MS20470AD3 MS20426AD3	Rivet	.096 - .101	40
MS20470AD4 MS20426AD4 CR3213-4	Rivet	.128 - .131	30
MS20470AD5 MS20470D5	Rivet	.159 - .160	21
10-32 AN3	Screw Bolt	.188 - .201	11
AN6	Bolt	.375 - .397	V

3. Torque

A. Values

Values for applying torque to fasteners are given in inch-pounds in this specification. English units are given in inch-pounds, in-lb., as well as foot-pounds, ft-lb. 12 in-lb. = 1 ft-lb. Conversions are as follows:

Multiply	by	to obtain
Foot-pounds, ft-lb.	12	Inch-pounds, in-lb.
Inch-pounds, in-lb.	0.0833	Foot-pounds, ft-lb.

B. Tooling Requirements

(1) Calibrated torque wrench

A calibrated torque wrench with the proper operating limits for the hardware should be chosen. The torque wrench is to have a valid and current calibration sticker affixed to it. Torque wrenches without a calibration sticker may not be used.

(2) Torque values when using adapters

If adapters are used that affect the length of the torque wrench, the final torque indication must be adjusted accordingly. Determine the torque wrench setting as shown in the following figure, Figure 7.1, and be sure to account for friction drag after determining the desired setting.

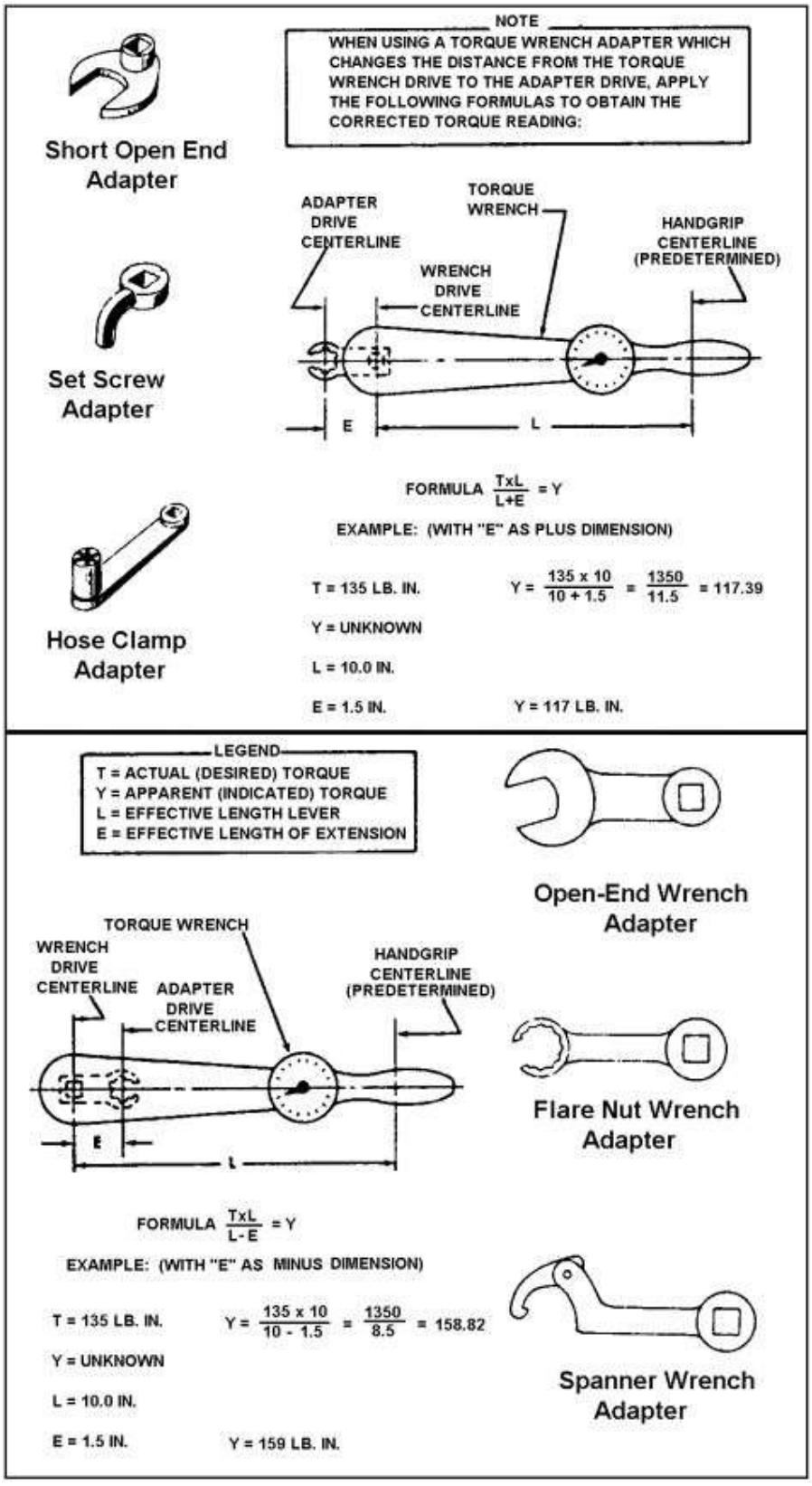

Figure 7.1-Torque Wrench with Various Adaptors
(from AC43.13-1B section7-43)

C. Hardware Cleanliness

All hardware is to be free from dirt, grit, and grease. Stainless steel hardware is particularly susceptible to galling when threaded parts have any dirt or grit on them. All stainless hardware should be stored in a way that prevents contamination from dust, for example, by keeping it in sealed bags or in closable bins. When stainless steel hardware is used, it should be kept bagged until it is installed. If stainless steel hardware is removed from an assembly for shipping, it should be wiped clean and re-bagged until re-assembly. Any dirty hardware should be thoroughly cleaned and lubricated with any dry film lubricant, such as LPS 1, Teflon, silicone, Mold Release, Krytox, Cetyl alcohol, etc.

D. Torque Procedure

Be sure the hardware is clean and dry unless specified on the drawing. Run the nut down to near contact with the washer or bearing surface and check the friction drag torque required to turn the nut. Whenever possible, apply the torque to the nut and not the bolt. This will reduce rotation of the bolt in the hole and reduce wear. Add the friction drag torque to the desired torque. This is referred to as “final torque,” which should register on the dial or setting for a snap-over type torque wrench. Apply a smooth even pull when applying torque pressure. If chattering or a jerking motion occurs during final torque, back off and re-torque. If this happens again, disassemble and check the threads for galling or burrs, discard if any are found. If a hardware assembly is torqued beyond the maximum torque, the items shall be disassembled, inspected for damage, re-assembled, and properly torqued.

See the sections on reused hardware and the use of adapters if applicable.

E. AN Bolts

(1) Torque

All AN bolts shall be properly torqued to the values in Figure 7.2 unless otherwise called out on the drawing. If torqueing an assembly deforms a part, Fliegen Works Inc. should be notified or the part repaired. Deformation may occur during the assembly of plastic parts, electrical components, straps, etc.

CAUTION
THE FOLLOWING TORQUE VALUES ARE DERIVED FROM OIL FREE CADMIUM PLATED THREADS.

	TORQUE LIMITS RECOMMENDED FOR INSTALLATION (BOLTS LOADED PRIMARILY IN SHEAR)		MAXIMUM ALLOWABLE TIGHTENING TORQUE LIMITS	
Thread Size	Tension type nuts MS20365 and AN310 (40,000 psi in bolts)	Shear type nuts MS20364 and AN320 (24,000 psi in bolts)	Nuts MS20365 and AN310 (90,000 psi in bolts)	Nuts MS20364 and AN320 (54,000 psi in bolts)
FINE THREAD SERIES				
8-36	12-15	7-9	20	12
10-32	20-25	12-15	40	25
1/4-28	50-70	30-40	100	60
5/16-24	100-140	60-85	225	140
3/8-24	160-190	95-110	390	240
7/16-20	450-500	270-300	840	500
1/2-20	480-690	290-410	1100	660
9/16-18	800-1000	480-600	1600	960
5/8-18	1100-1300	600-780	2400	1400
3/4-16	2300-2500	1300-1500	5000	3000
7/8-14	2500-3000	1500-1800	7000	4200
1-14	3700-5500	2200-3300*	10,000	6000
1-1/8-12	5000-7000	3000-4200*	15,000	9000
1-1/4-12	9000-11,000	5400-6600*	25,000	15,000
COARSE THREAD SERIES				
8-32	12-15	7-9	20	12
10-24	20-25	12-15	35	21
1/4-20	40-50	25-30	75	45
5/16-18	80-90	48-55	160	100
3/8-16	160-185	95-100	275	170
7/16-14	235-255	140-155	475	280
1/2-13	400-480	240-290	880	520
9/16-12	500-700	300-420	1100	650
5/8-11	700-900	420-540	1500	900
3/4-10	1150-1600	700-950	2500	1500
7/8-9	2200-3000	1300-1800	4600	2700

The above torque values may be used for all cadmium-plated steel nuts of the fine or coarse thread series which have approximately equal number of threads and equal face bearing areas.
* Estimated corresponding values.

Figure 7.2 Recommended Torque Values,
(from AC43.13-1B table 7-1)

(2) Torque Order

When groups of bolts are torqued, the outermost bolts shall be torqued first, and the inner bolts last. When applying torque to circular patterns, the bolts should be torqued across the circle, in a star pattern.

(3) Bolt Length

All bolt installations that involve a self-locking nut or plain nut shall have a minimum of 1 full thread of the bolt protruding through the nut. The shank of the bolt must not contact the nut when the nut is torqued. If the above conditions cannot be met, a bolt of the next dash number longer or shorter should be installed (see section 3.I, page 706, on washer stack-up).

F. Special Bolts

(1) Torque

Torque per Figure 7.2.

G. Screws

Screws that have a non-threaded shank, are size 10 or larger, and are installed with a loose nut, shall be torqued to the values listed in Figure 7.2. Other screws should be tightened by hand approximately 1/4 turn past run-up of the assembly. Brass and aluminum screws are easily stripped, so care should be exercised not to over-torque.

(1) Screw Length

All screw installations that involve a self-locking nut or plain nut shall have a minimum of 1 full thread of the screw protruding through the nut. The shank of the screw must not contact the nut when the nut is torqued. If the above conditions cannot be met, a screw of the next dash number longer or shorter may be installed.

H. Nuts

(1) Self-locking Nuts

Self-locking nuts, when re-used, must have at least the minimum prevailing torque from Figure 7.3. Nuts smaller than those listed in the table shall not be used if they can be run up by hand.

Fine Thread Series	
Thread Size	**Minimum Prevailing Torque (in-lbs.)**
7/16 - 20	8
1/2 - 20	10
9/16 - 18	13
5/8 - 18	18
3/4 - 16	27
7/8 - 14	40
1 - 14	55
1-1/8 - 12	73
1-1/4 - 12	94
Coarse Thread Series	
Thread Size	**Minimum Prevailing Torque (in-lbs.)**
7/16 - 14	8
1/2 - 13	10
9/16 - 12	14
5/8 - 11	20
3/4 - 10	27
7/8 - 9	40
1 - 8	51
1-1/8 - 8	68
1-1/4 - 8	88

Figure 7.3
Minimum Prevailing Torque Values for Re-used Self-locking Nuts,
(from AC43.13-1B table 7.2)

I. Washers

The addition of washers to an assembly to eliminate threads in a bearing is allowed. An assembly may have up to 2 washers under a nut and 1 washer under a bolt head.

The substitution of a thin washer for a thick washer to provide adequate thread engagement is allowed. The removal of a washer under the head of a bolt is allowed, provided the bolt does not rotate and can be tightened from the nut end. It is preferable that the fastener has the proper nominal grip length. If the stack up is such that variations in tolerances or coating thickness changes, changing the washer thickness or adding washers is preferred.

J. Re-use of Hardware

If any hardware is reassembled, special attention should be paid to the quality of the threads. If the hardware requires excess torque to assemble, or chatters during assembly, the hardware must be discarded. The threads are likely damaged and are galling.

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. General

A. Facilities

The repair facility shall be equipped to perform all phases of overhaul and modifications as directed in this CMM. These facilities shall include, but are not limited to, machine shop, cleaning, and testing. Facilities shall have such environmental control as to provide the greatest possible care to prevent damage and deterioration to equipment during storage, movement, unpacking, overhaul and repair operation, and testing, as well as after acceptance.

B. Support Items

(1) Special Tools and Equipment

Calibrated spring scale 0-20 lbs.
Calibrated tension scale – up to expected load.

(2) Fabricated Tools and Equipment

There are no fabricated tools for this CMM.

(3) Finite Life Items, Time Between Overhaul (TBO) Items, and Mandatory Replacement Parts

Not applicable.

(4) Repair Parts

Not applicable.

C. Modifications

(1) Strap

A small strap made from 4130N steel alloy may be welded onto the Hook Housing if using Tow Hook Assembly P/N 6027 or P/N 6029. See page 601 for details on fabrication and installation of the steel strap.

2. Standards

A. Quality of Material

Parts and materials used for replacement, repair, and modification of the Tow Hook assembly will comply with the applicable drawings and specifications, unless otherwise specified in the CMM.

B. Man-hour Standards

Preflight: 3 minutes
A-phase: 15 minutes
B-phase: 1 hour

C. Electromagnetic Compatibility Standards

Not applicable.

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ILLUSTRATED PARTS LIST

1. Introduction

A. Statement of purpose of the IPL

The purpose of this Illustrated Parts List is to provide the repair facility with detailed parts data for repair or replacement of components.

B. Explanation of how to use the IPL

A numerical parts list and detailed exploded views of the component are provided.

Find the part or subassembly of interest, locate the applicable figure, find the appropriate number from the figure, and then find the corresponding part number in the table immediately following the figure.

C. List of abbreviations and list of terminology that has varying interpretations

Not applicable

D. List of names and addresses of all vendors supplying items or articles

Fliegen Works Inc.
921 SE 47th Avenue
Portland, OR 97215
503 221-4001

E. Explanation of the model/series/type of the unit covered by the parts list

Installs and subassemblies are covered by this IPL and are in the following order:

1. Introduction
2. 1000, Tow Link – Safety
3. 1200, PATH Tow Hook Installation for Piper PA-18, ETC.
4. 1210, PATH Tow Hook Installation for Piper PA-22, ETC.
5. 1220, PATH Dual Tow Hook Install for Piper PA-22 & Colt-108
6. 1240, PATH Tow Hook Installation for Cessna 170, 170A, & 170B
7. 1250, PATH Tow Hook Installation for Cessna 172, ETC.
8. 1260, PATH Tow Hook Installation for Cessna 150, 172, ETC.
9. 1270, PATH Tow Hook Installation for Boeing A75
10. 1280, PATH Tow Hook Installation for Aeronca
11. 1290, PATH Tow Hook Installation for Cessna Models 180 & 185
12. 6025, Release Subassembly
13. 6027, Tow Hook Assembly
14. 6028, Tow Hook with Stop
15. 6029, Tow Hook Assembly with Mounting Lug
16. 6030, Tow Hook/Lug with Stop
17. 6140, Release Handle
18. 6200, Tow Release Bracket for Cessna 180 & 185

The installation in the aeronautical product may contain additional items that are not covered here. Consult the equipment manufacturer's data for parts data.

2. Tow Link – Safety, 1000

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.	-03 Qty. Req.	-04 Qty. Req.	-05 Qty. Req.
1000-1	Tow Link – Safety		1	X				
1000-2	Tow Link – Safety		2		X			
1000-3	Tow Link – Safety		3			X		
1000-4	Tow Link – Safety		4				X	
1000-5	Tow Link – Safety		5					X
1001-1	Tow Link – Link	2.2	6	2	2	2	2	2
1001-2	Tow Link – Link	2.2	7	1	1	1	1	1
1002	Tow Link – Ring	2.2	8	2	2	2	2	2
1003	Tow Link – Pin	2.2	9	1	1	1	1	1
AN470B3-8	Rivet	2.2	10	1	1			
AN470B4-9	Rivet	2.2	10			1	1	1

Numerical Index: Tow Link – Safety
Figure 2.1

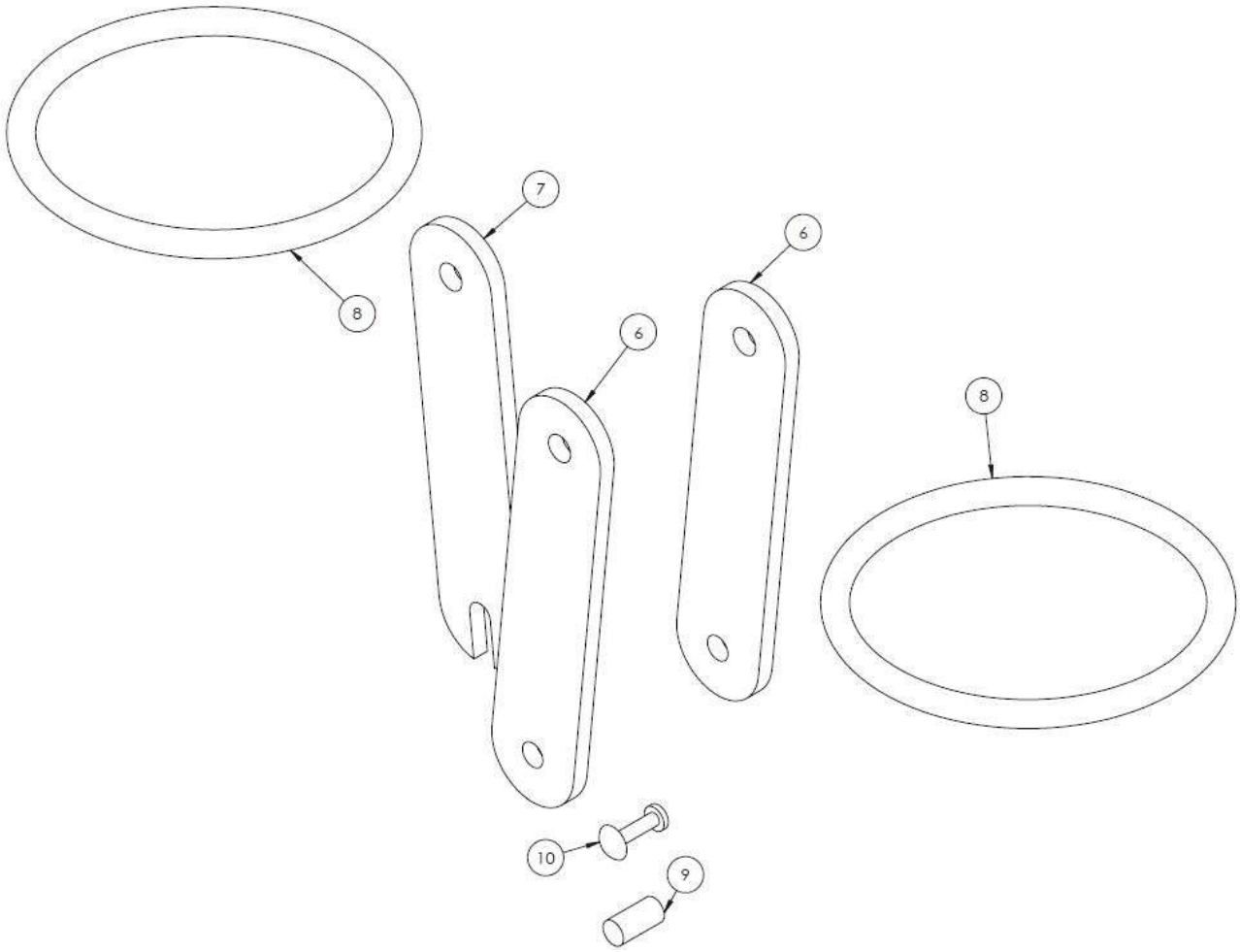

Figure 2.2: Tow Link – Safety

3. PATH Tow Hook Installation for Piper PA-18, ETC., 1200

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1200-01	PATH Tow Hook Installation for Piper PA-18, ETC.		1	X	
1200-02	PATH Tow Hook Installation for Piper PA-18, ETC.		2		X
1201	PATH Single – Tow Bar for Piper	3.3	3	1	1
6030	Tow Hook – Lug with Stop	3.3	4	1	
6029	Tow Hook Assembly with Mounting Lug	3.3	4	ALT	
6028	Tow Hook with Stop	3.3	4		1
6027	Tow Hook Assembly	3.3	4		ALT
6131	Tow Ring	3.3	5	1	1
1000	Tow Link – Safety	3.3	5	ALT	ALT
05-00115	Nylaflow Tubing	3.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	3.3	7	AR	AR
MS51844-23	Nicopress Sleeve	3.3	8		1
MS21919DG-4	Adel Clamp	3.3	9	1	1
AN8-11A	Bolt	3.3	10	1	
AN365-820	Nut	3.3	11	1	
AN960-816	Washer, Flat	3.3	12	2	
MS35489-9	Grommet	3.3	13	1	1
AN100C-4	Thimble	3.3	14	1	1
AN525-10R6	Screw, Structural – Washer Head	3.3	15	1	1
AN365-1032A	Nut	3.3	16	1	1
6151	Release Handle Assembly	3.2	17	AR	AR
1060-01	Placard, Glider Towing	3.2	18	1	1
1060-02	Placard, Banner Towing	3.2	19	1	1

Numerical Index: PATH Tow Hook Installation for Piper PA-18, ETC.

Figure 3.1

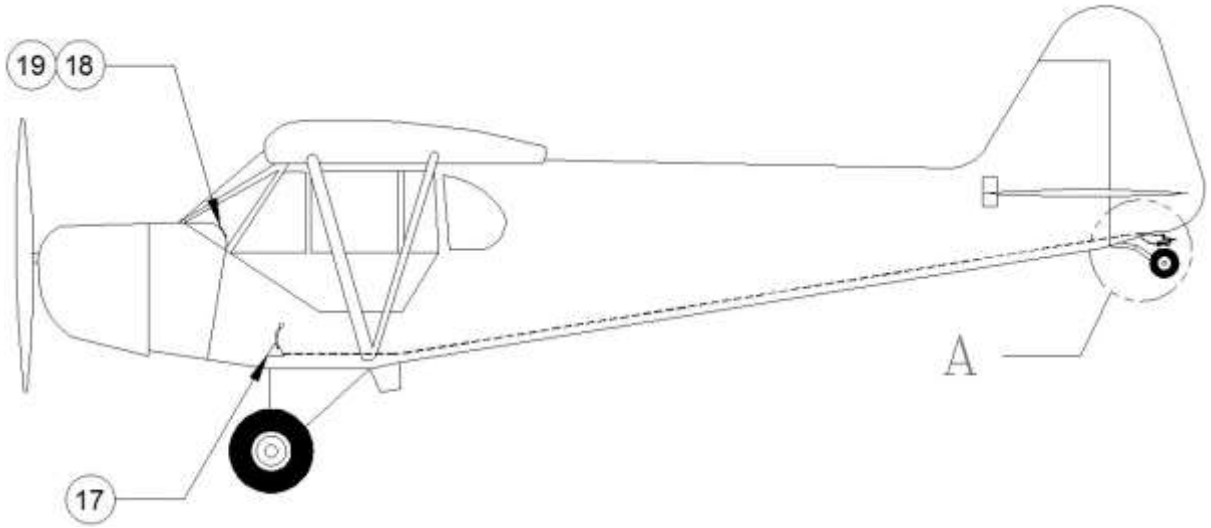

Figure 3.2: PATH Tow Hook Installation for Piper PA-18, ETC (Piper J-3 Shown)

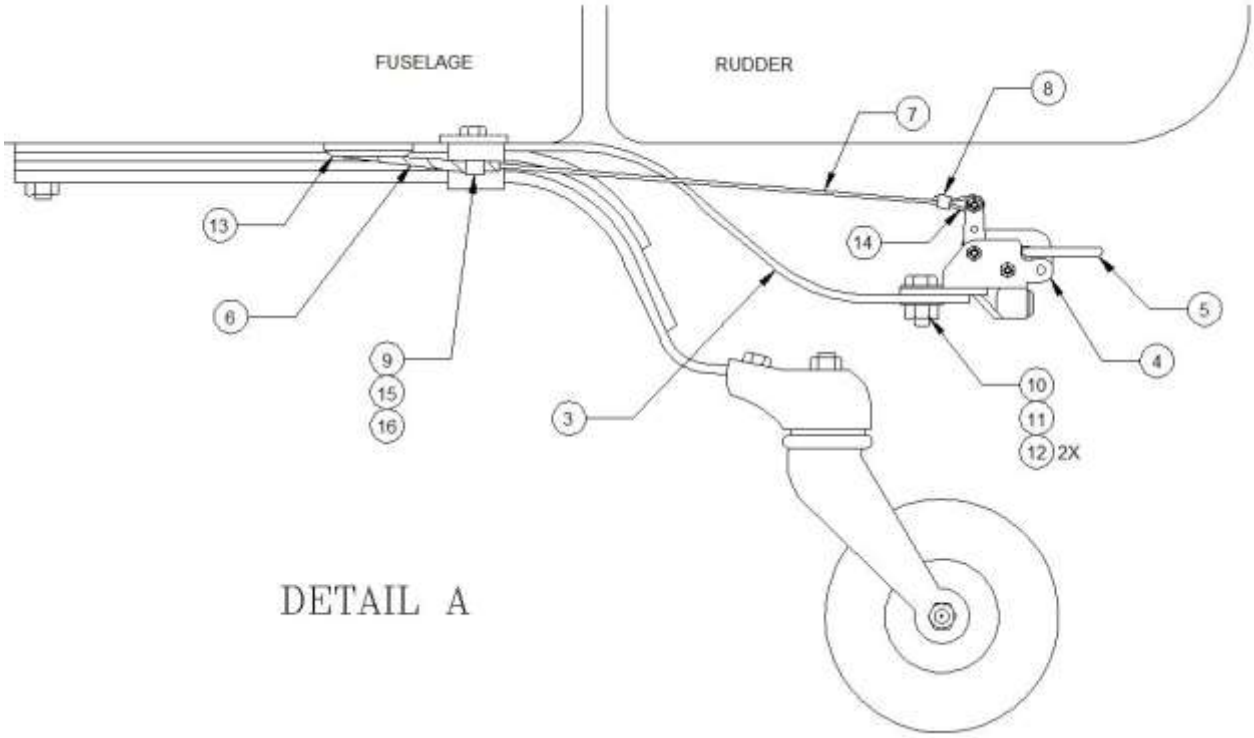

Figure 3.3: PATH Tow Hook Installation for Piper PA-18, ETC., Detail A

4. PATH Tow Hook Installation for Piper PA-22, ETC., 1210

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1210-01	PATH Tow Hook Installation for Piper PA-22, ETC.		1	X	
1210-02	PATH Tow Hook Installation for Piper PA-22, ETC.		2		X
1211-3	Tow Bar Assembly	4.3	3	1	1
6030	Tow Hook – Lug with Stop	4.3	4	1	
6029	Tow Hook Assembly with Mounting Lug	4.3	4	ALT	
6028	Tow Hook with Stop	4.3	4		1
6027	Tow Hook Assembly	4.3	4		ALT
6131	Tow Ring	4.3	5	1	1
1000	Tow Link – Safety	4.3	5	ALT	ALT
05-00115	Nylaflow Tubing	4.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	4.3	7	AR	AR
MS51844-23	Nicopress Sleeve	4.3	8	1	1
MS21919DG-4	Adel Clamp	4.3	9	1	1
MS21919DG-8	Adel Clamp	4.3	10	1	1
MS35489-9	Grommet	4.3	11	1	1
AN8-11A	Bolt	4.3	12	1	
AN525-10R6	Screw, Structural – Washer Head	4.3	13	1	1
AN365-820	Nut	4.3	14	1	
AN365-1032A	Nut	4.3	15	1	1
AN960-816	Washer, Flat	4.3	16	2	
AN100C-4	Thimble	4.3	17	1	1
6151	Release Handle Assembly	4.2	18	AR	AR
1060-01	Placard, Glider Towing	4.2	19	1	1
1060-02	Placard, Banner Towing	4.2	20	1	1

Numerical Index: PATH Tow Hook Installation for Piper PA-22, ETC.
Figure 4.1

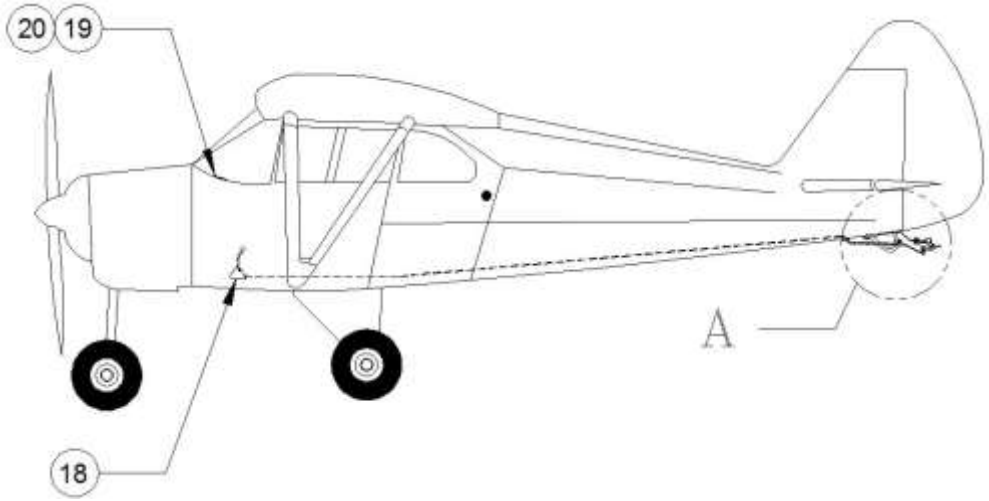

Figure 4.2: PATH Tow Hook Installation for Piper PA-22, ETC. (Piper PA-22 Shown)

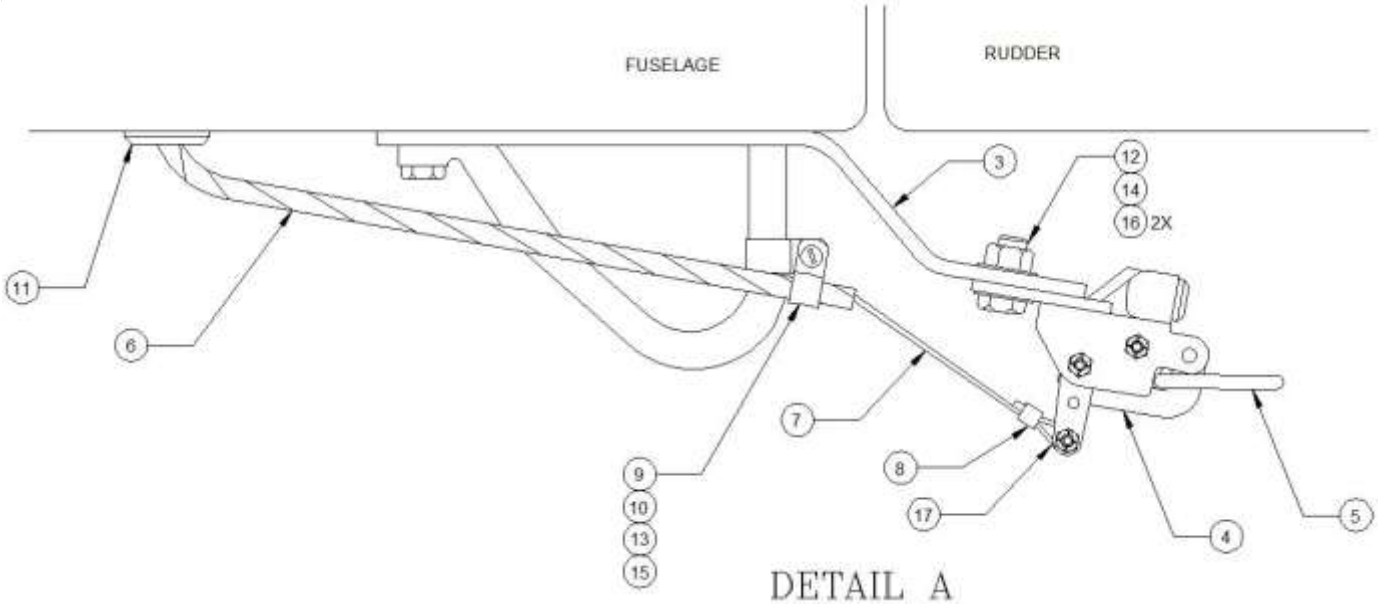

Figure 4.3: PATH Tow Hook Installation for Piper PA-22, ETC., Detail A

5. PATH Dual tow Hook Install for Piper PA-22 & Colt-108, 1220

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1220-01	PATH Dual tow Hook Install for Piper PA-22 & Colt-108		1	X	
1220-02	PATH Dual tow Hook Install for Piper PA-22 & Colt-108		2		X
1221-3	Tow Bar Assembly	5.3	3	1	1
6030	Tow Hook – Lug with Stop	5.3	4	1	
6029	Tow Hook Assembly with Mounting Lug	5.3	4	ALT	
6028	Tow Hook with Stop	5.3	4		1
6027	Tow Hook Assembly	5.3	4		ALT
6131	Tow Ring	5.3	5	1	1
1000	Tow Link – Safety	5.3	5	ALT	ALT
05-00115	Nylaflow Tubing	5.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	5.3	7	AR	AR
MS51844-23	Nicopress Sleeve	5.3	8	1	1
MS21919DG-4	Adel Clamp	5.3	9	1	1
MS21919DG-8	Adel Clamp	5.3	10	1	1
MS35489-16	Grommet	5.3	11	1	1
AN8-11A	Bolt	5.3	12	1	
AN525-10R6	Screw, Structural – Washer Head	5.3	13	1	1
AN365-820	Nut	5.3	14	1	
AN365-1032A	Nut	5.3	15	1	1
AN960-816	Washer, Flat	5.3	16	2	
AN100C-4	Thimble	5.3	17	1	1
6151	Release Handle Assembly	5.2	18	AR	AR
1060-01	Placard, Glider Towing	5.2	19	1	1
1060-02	Placard, Banner Towing	5.2	20	1	1

Numerical Index: PATH Dual tow Hook Install for Piper PA-22 & Colt-108

Figure 5.1

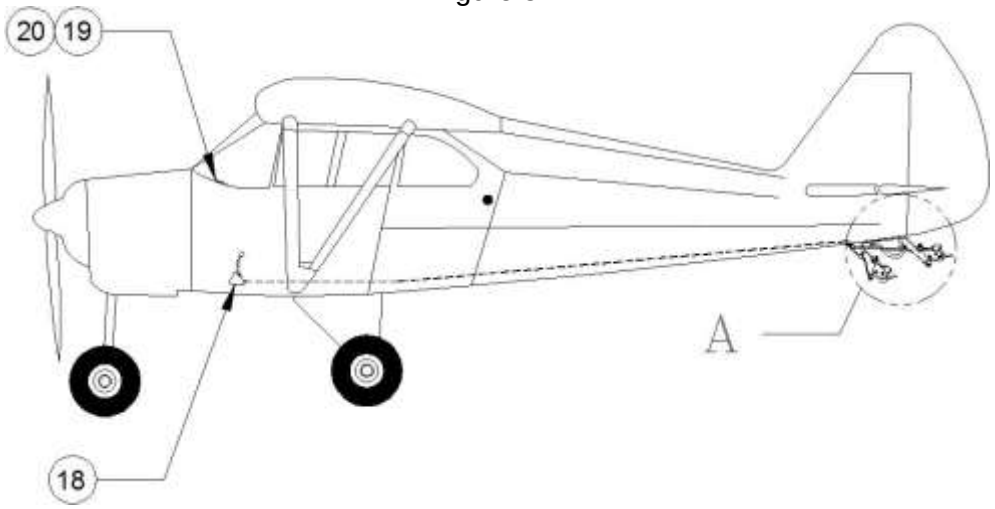

Figure 5.2: PATH Dual tow Hook Install for Piper PA-22 & Colt-108 (Piper PA-22 Shown)

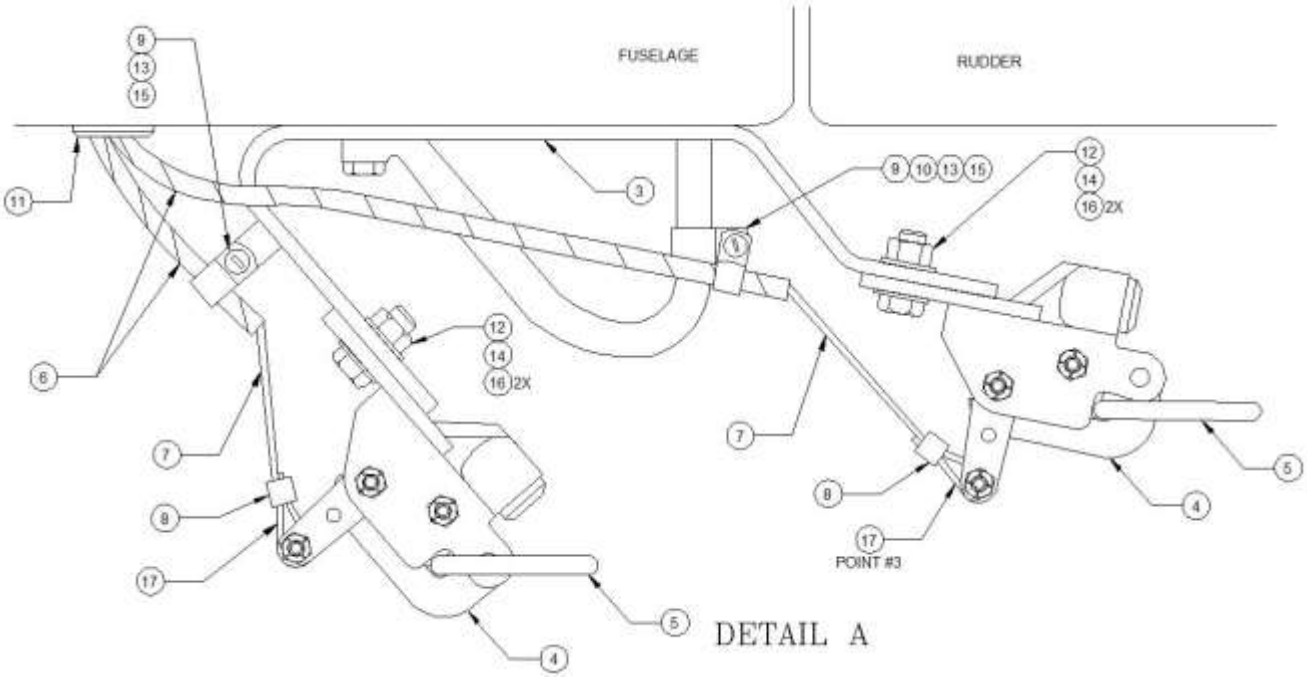

Figure 5.3: PATH Dual tow Hook Install for Piper PA-22 & Colt-108, Detail A

6. PATH Tow Hook Installation for Cessna 170, 170A, & 170B, 1240

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1240-01	PATH Tow Hook Installation for Cessna 170, 170A, & 170B		1	X	
1240-02	PATH Tow Hook Installation for Cessna 170, 170A, & 170B		2		X
1242-1	Tow Bar Assembly	6.3	3	1	1
6030	Tow Hook – Lug with Stop	6.3	4	1	
6029	Tow Hook Assembly with Mounting Lug	6.3	4	ALT	
6028	Tow Hook with Stop	6.3	4		1
6027	Tow Hook Assembly	6.3	4		ALT
6131	Tow Ring	6.3	5	1	1
1000	Tow Link – Safety	6.3	5	ALT	ALT
05-00115	Nylaflow Tubing	6.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	6.3	7	AR	AR
MS51844-23	Nicopress Sleeve	6.3	8	1	1
MS21919DG-4	Adel Clamp	6.3	9	AR	1
AN365-820	Nut	6.3	10	1	
AN8-11A	Bolt	6.3	11	1	
AN960-816	Washer, Flat	6.3	12	2	
MD35489-9	Grommet	6.3	13	1	1
AN100C-4	Thimble	6.3	14	1	1
AN525-10R6	Screw – Structural, Washer Head	6.3	15	1	1
AN365-1032A	Nut	6.3	16	1	1
6151	Release Handle Assembly	6.2	17	AR	AR
1060-01	Placard, Glider Towing	6.2	18	1	1
1060-02	Placard, Banner Towing	6.2	19	1	1

Numerical Index: PATH Tow Hook Installation for Cessna 170, 170A, & 170B

Figure 6.1

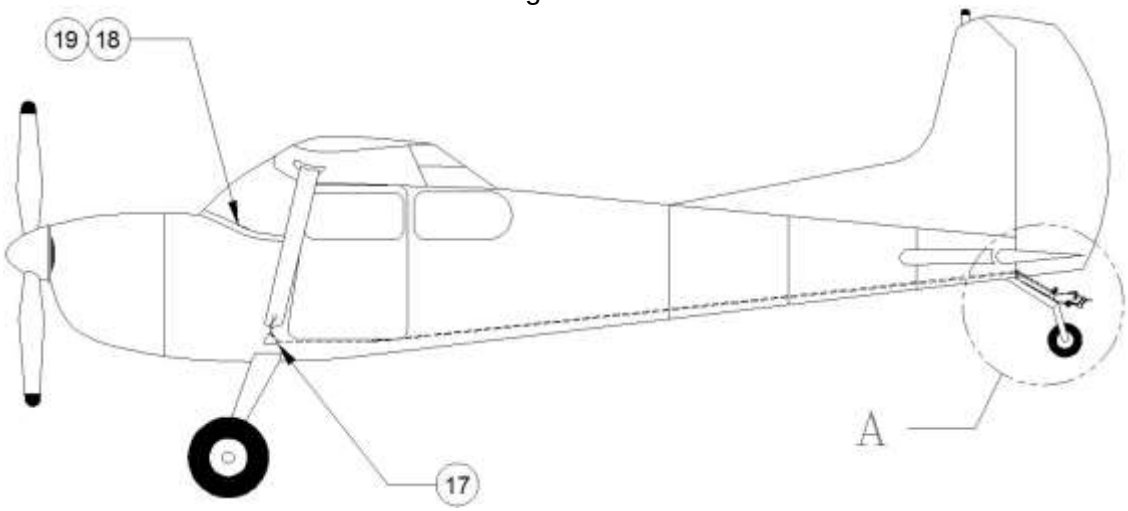

Figure 6.2: PATH Tow Hook Installation for Cessna 170, 170A, & 170B (Cessna 170 Shown)

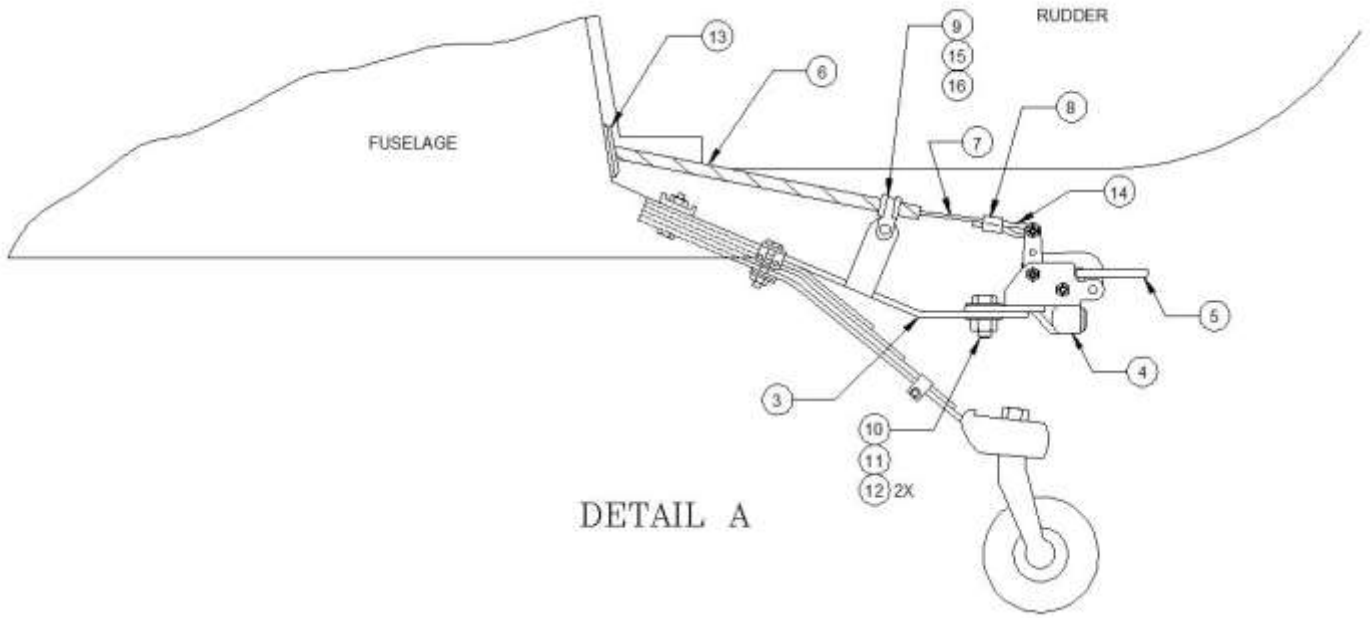

Figure 6.3: PATH Tow Hook Installation for Cessna 170, 170A, & 170B

7. PATH Tow Hook Installation for Cessna 172, ETC., 1250

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.	-03 Qty. Req.
1250-01	PATH Tow Hook Installation for Cessna 172, ETC.		1	X		
1250-02	PATH Tow Hook Installation for Cessna 172, ETC.		2		X	
1250-03	PATH Tow Hook Installation for Cessna 172, ETC.		3			X
1259-1	Tow Bar Assembly	7.3	4	1	1	
1252	Tow Hook Bracket for Cesnna Models	7.4	5			1
6030	Tow Hook – Lug with Stop	7.3	6	1		1
6029	Tow Hook Assembly with Mounting Lug	7.3	6	ALT		ALT
6028	Tow Hook with Stop	7.3	6		1	
6027	Tow Hook Assembly	7.3	6		ALT	
6131	Tow Ring	7.3	7	1	1	1
1000	Tow Link – Safety	7.3	7	ALT	ALT	ALT
05-00115	Nylaflow Tubing	7.3	8	AR	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	7.3	9	AR	AR	AR
MS51844-23	Nicopress Sleeve	7.3	10	1	1	1
MS21919DG-4	Adel Clamp	7.3	11	1	1	1
AN5-13A	Bolt	7.3	12	1	1	1
AN8-11A	Bolt	7.3	13	1		1
AN525-10R6	Screw – Structural, Washer Head	7.3	14	1	1	1
AN365-1032A	Nut	7.3	15	1	1	1
AN365-820	Nut	7.3	16	1		1
MS35489-9	Grommet	7.3	17	1	1	1
AN9960-816	Washer, Flat	7.3	18	2		2
AN100C-4	Thimble	7.3	19	1	1	1
6151	Release Handle Assembly	7.2	20	AR	AR	AR
1060-01	Placard, Glider Towing	7.2	21	1	1	1
1060-02	Placard, Banner Towing	7.2	22	1	1	1

Numerical Index: PATH Tow Hook Installation for Cessna 172, ETC.
Figure 7.1

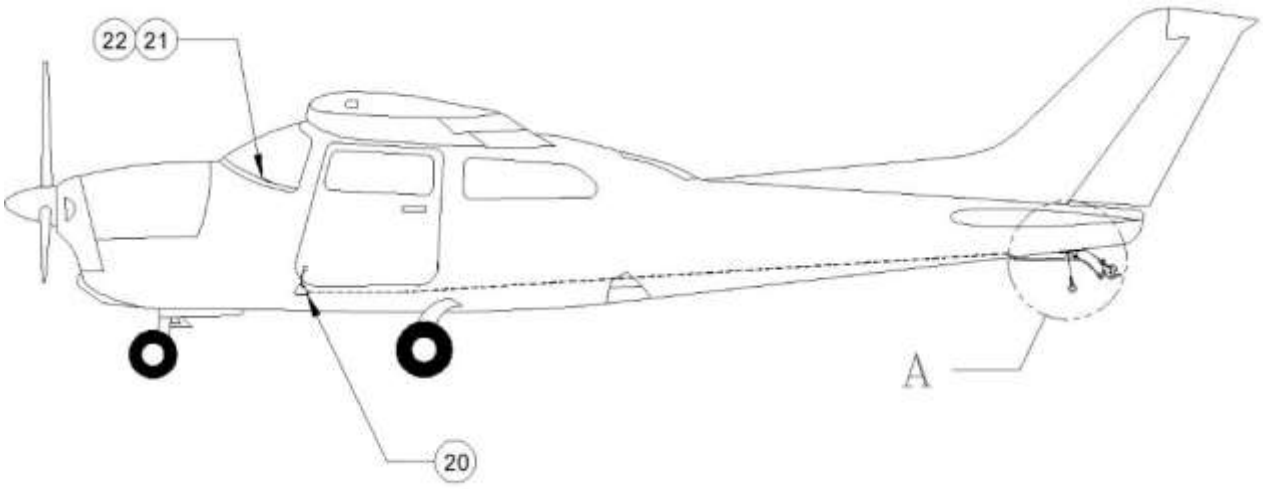

Figure 7.2: PATH Tow Hook Installation for Cessna 172, ETC. (Cessna 182 Shown)

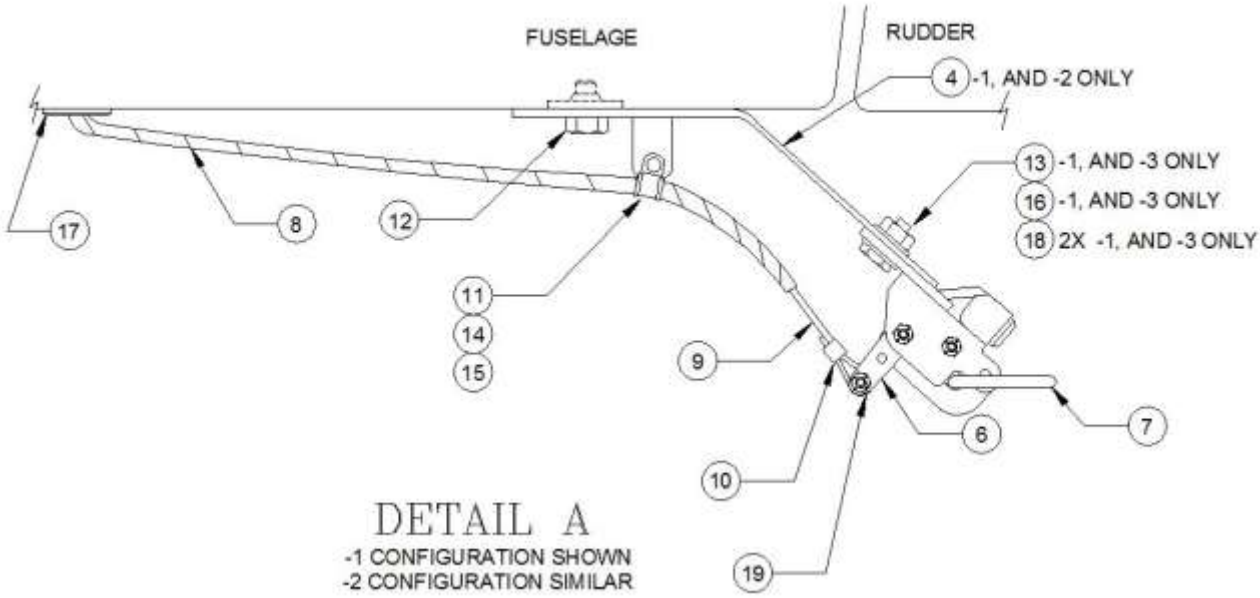

Figure 7.3: PATH Tow Hook Installation for Cessna 172, ETC. (-01 Configuration) Detail A

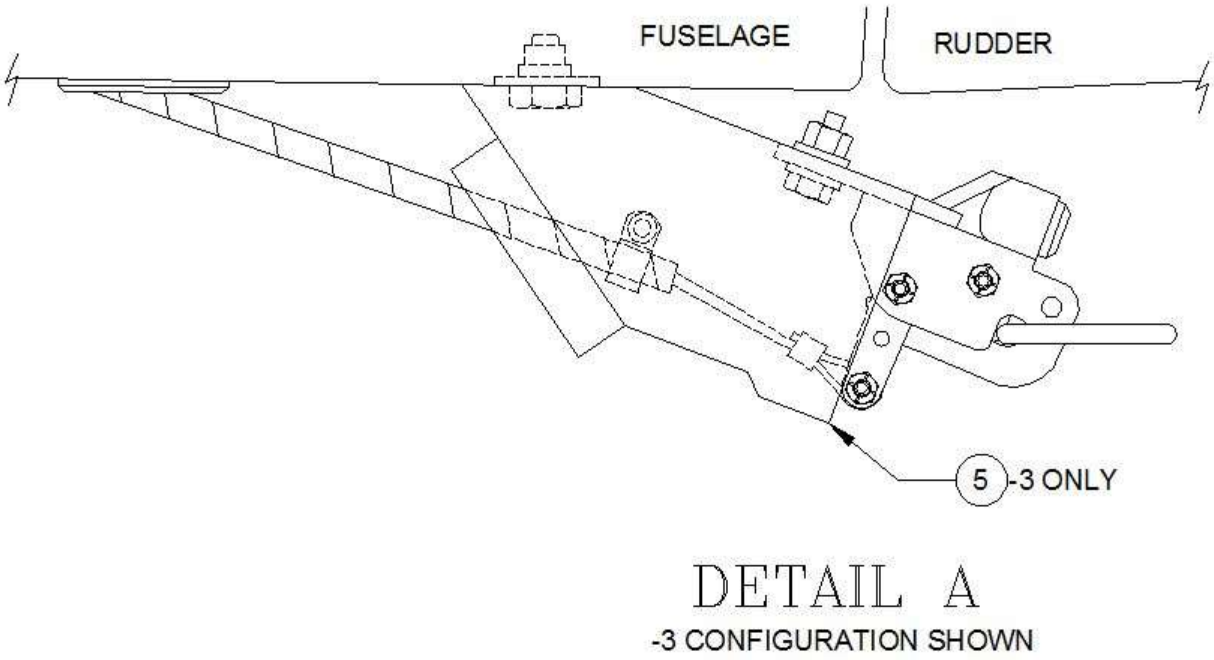

Figure 7.4: PATH Tow Hook Installation for Cessna 172, ETC. (-03 Configuration) Detail A

8. PATH Tow Hook Installation for Cessna 150, 172, ETC., 1260

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1260-01	PATH Tow Hook Installation for Cessna 150, 172, ETC.		1	X	
1260-02	PATH Tow Hook Installation for Cessna 150, 172, ETC.		2		X
1262-1	Tow Bar	8.3	3	1	1
6030	Tow Hook – Lug with Stop	8.3	4	2	
6029	Tow Hook Assembly with Mounting Lug	8.3	4	ALT	
6028	Tow Hook with Stop	8.3	4		1
6027	Tow Hook Assembly	8.3	4		ALT
6131	Tow Ring	8.3	5	2	1
1000	Tow Link – Safety	8.3	5	ALT	ALT
05-00115	Nylaflow Tubing	8.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	8.3	7	AR	AR
MS51844-23	Nicopress Sleeve	8.3	8	2	2
MS21919DG-4	Adel Clamp	8.3	9	2	2
AN5-13A	Bolt	8.3	10	1	1
AN8-11A	Bolt	8.3	11	2	
AN525-10R6	Screw – Structural, Washer Head	8.3	12	2	2
AN365-1032A	Nut	8.3	13	2	2
AN365-820	Nut	8.3	14	2	
MS35489-16	Grommet	8.3	15	1	1
AN960-816	Washer, Flat	8.3	16	4	
AN100C-4	Thimble	8.3	17	2	2
6151	Release Handle Assembly	8.2	18	AR	AR
1060-01	Placard, Glider Towing	8.2	19	1	1
1060-02	Placard, Banner Towing	8.2	20	1	1

Numerical Index: PATH Tow Hook Installation for Cessna 150, 172, ETC.
Figure 8.1

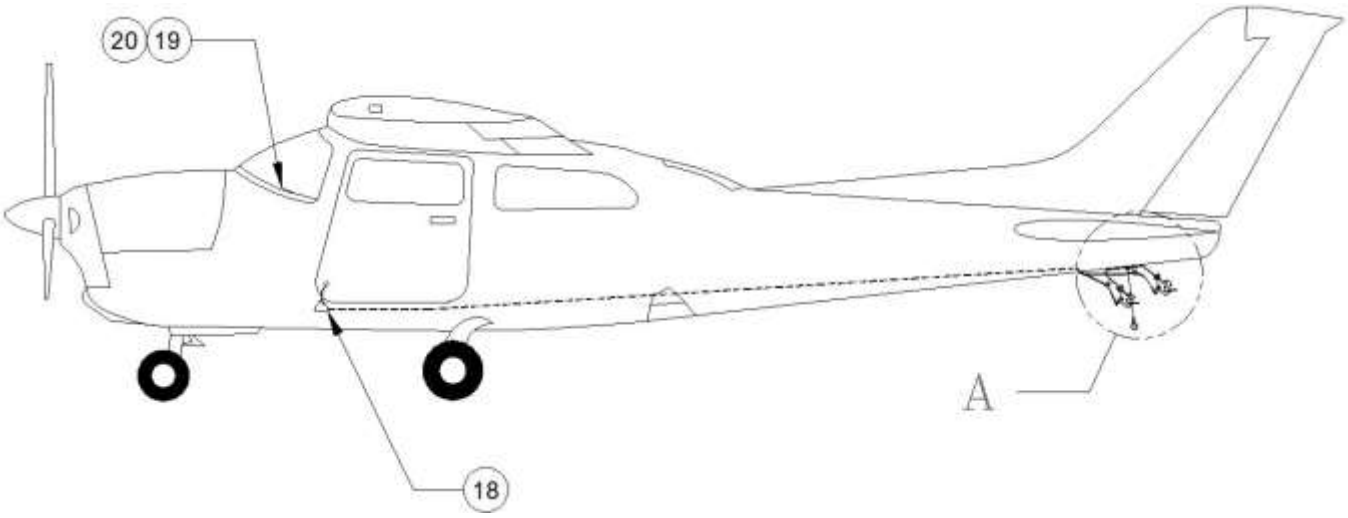

Figure 8.2: PATH Tow Hook Installation for Cessna 150, 172, ETC. (Cessna 182 Shown)

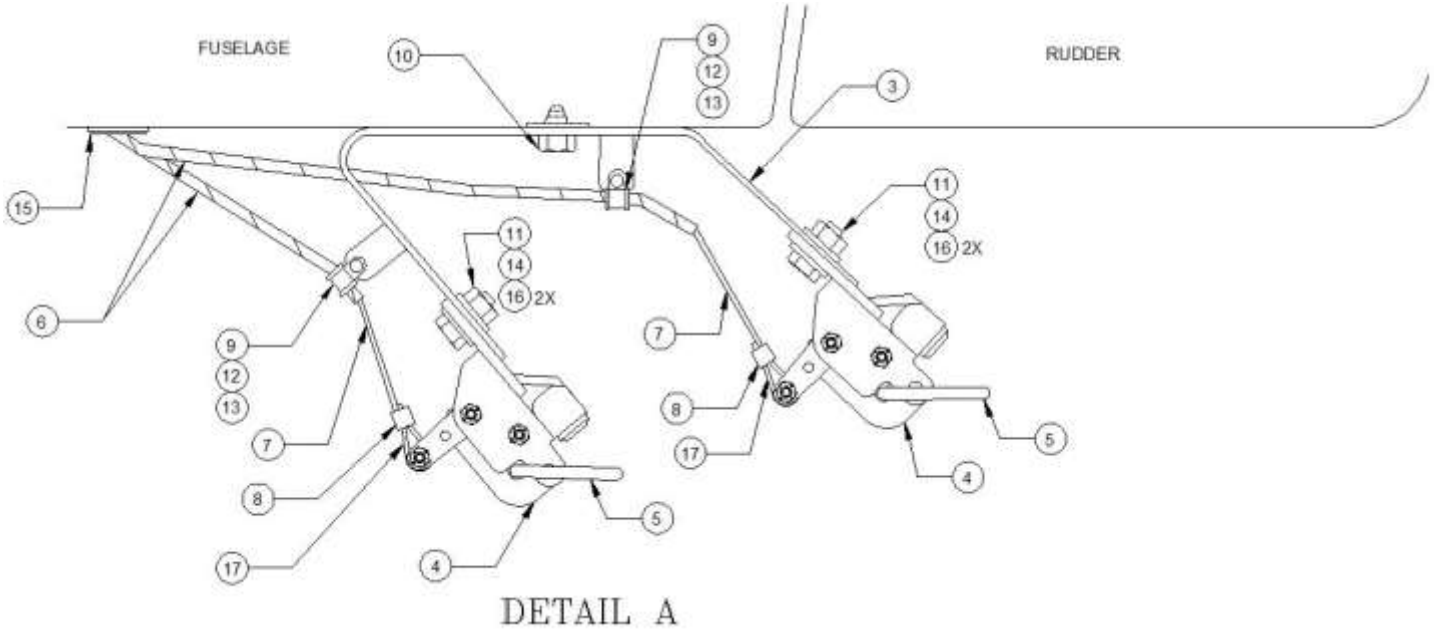

Figure 8.3: PATH Tow Hook Installation for Cessna 150, 172, ETC., Detail A

9. PATH Tow Hook Installation for Boeing A75, 1270

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1270-01	PATH Tow Hook Installation for Boeing A75		1	X	
1270-02	PATH Tow Hook Installation for Boeing A75		2		X
1271	Tow Bar	9.3	3	1	1
1272-7	Brace	9.3	4	2	2
1272-9	Bracket	9.3	5	1	1
6030	Tow Hook – Lug with Stop	9.3	6	1	
6029	Tow Hook Assembly with Mounting Lug	9.3	6	ALT	
6028	Tow Hook with Stop	9.3	6		1
6027	Tow Hook Assembly	9.3	6		ALT
6131	Tow Ring	9.3	7	1	1
1000	Tow Link – Safety	9.3	7	ALT	ALT
05-00115	Nylaflow Tubing	9.3	8	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	9.3	9	AR	AR
MS51844-23	Nicopress Sleeve	9.3	10	1	1
MS21919DG-4	Adel Clamp	9.3	11	1	1
AN8-11A	Bolt	9.3	12	1	
AN5-60	Bolt	9.3	13	1	1
AN5-50	Bolt	9.3	14	1	1
AN960-516	Washer	9.3	15	2	2
AN310-5	Nut	9.3	16	2	2
AN365-820	Nut	9.3	17	1	
AN365-1032A	Nut	9.3	18	1	1
AN380-2	Cotter Pin	9.3	19	2	2
AN525-10R9	Screw – Structural, Washer Head	9.3	20	1	1
AN960-816	Washer, Flat	9.3	21	2	
MS36589-9	Grommet	9.3	22	1	1
AN100C-4	Thimble	9.3	23	1	1
6151	Release Handle Assembly	9.2	24	AR	AR
1060-01	Placard, Glider Towing	9.2	25	1	1
1060-02	Placard, Banner Towing	9.2	26	1	1

Numerical Index: PATH Tow Hook Installation for Boeing A75
Figure 9.1

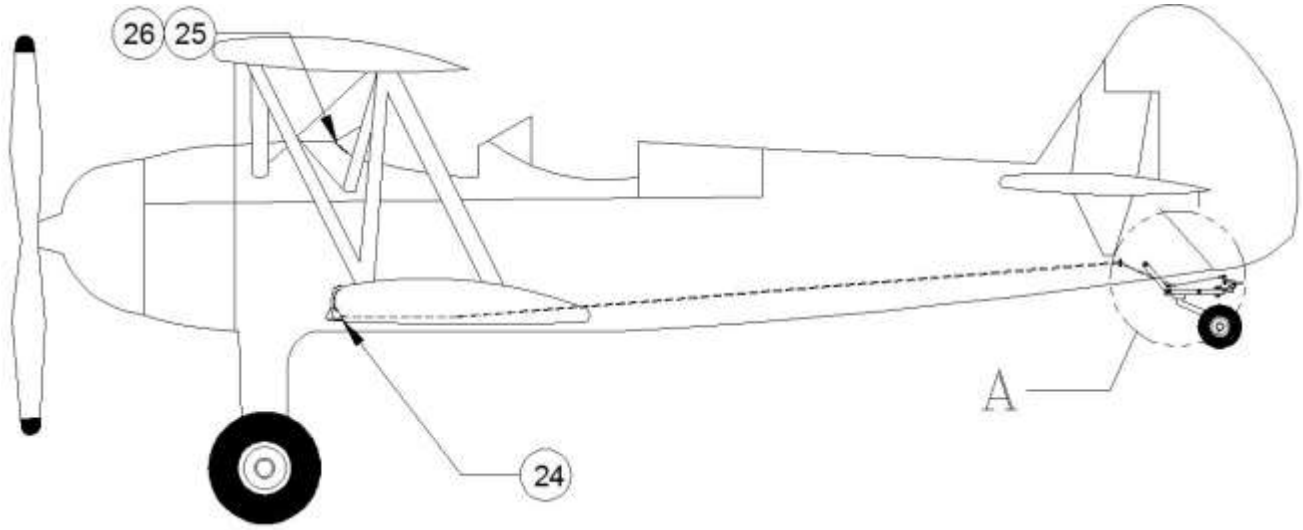

Figure 9.2: PATH Tow Hook Installation for Boeing A75

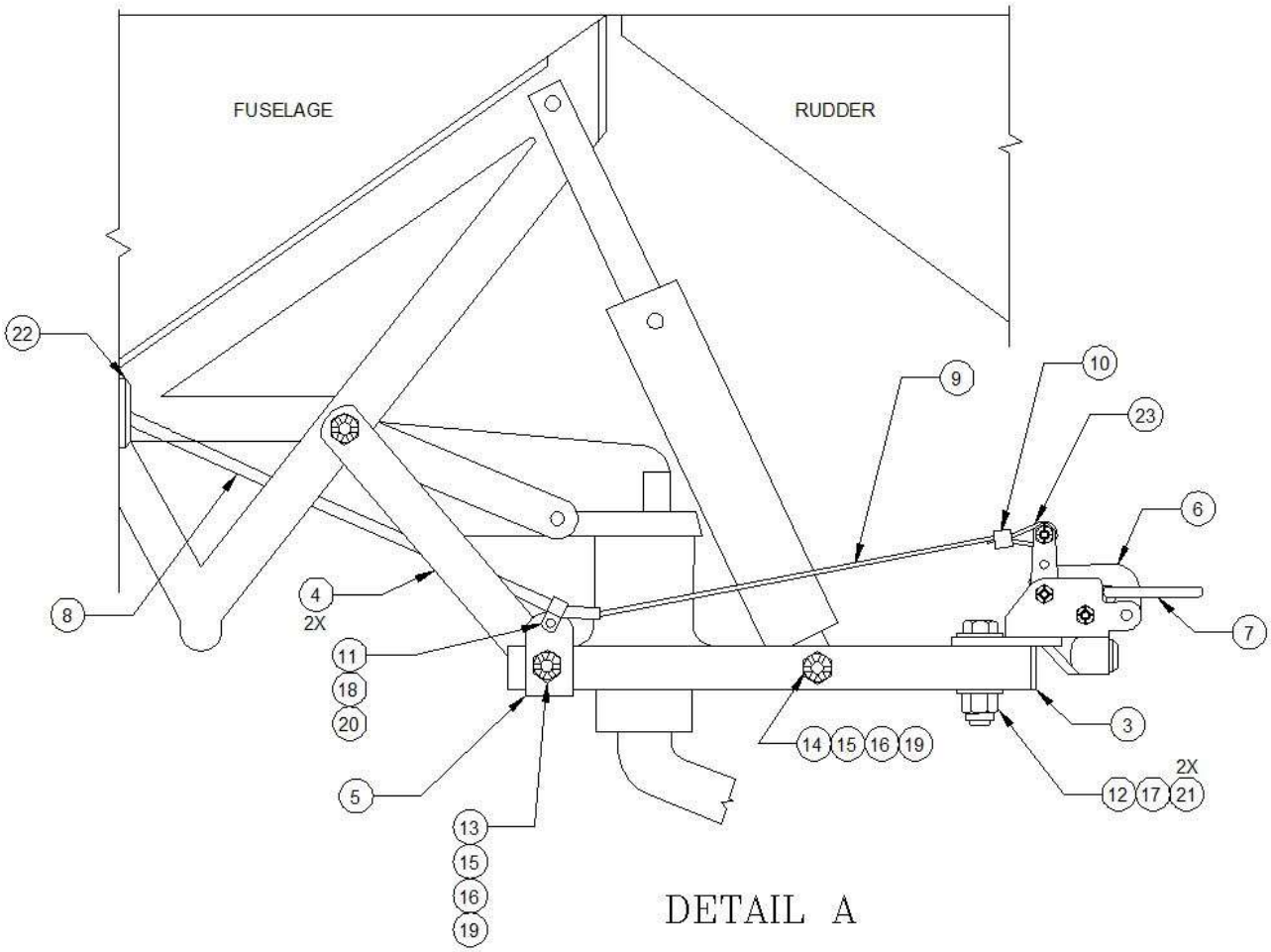

Figure 9.3: PATH Tow Hook Installation for Boeing A75, Detail A

10. PATH Tow Hook Installation for Aeronca, 1280

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1280-01	PATH Tow Hook Installation for Aeronca		1	X	
1280-02	PATH Tow Hook Installation for Aeronca		2		X
1281	PATH Tow Bar for Aeronca	10.3	3	1	1
6030	Tow Hook – Lug with Stop	10.3	4	1	
6029	Tow Hook Assembly with Mounting Lug	10.3	4	ALT	
6028	Tow Hook with Stop	10.3	4		1
6027	Tow Hook Assembly	10.3	4		ALT
6131	Tow Ring	10.3	5	1	1
1000	Tow Link – Safety	10.3	5	ALT	ALT
05-00115	Nylaflow Tubing	10.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	10.3	7	AR	AR
MS51844-23	Nicopress Sleeve	10.3	8	1	1
MS21919DG-4	Adel Clamp	10.3	9	1	1
AN365-1032A	Nut	10.3	10	1	1
AN365-820	Nut	10.3	11	1	
AN8-11A	Bolt	10.3	12	1	
AN525-10R6	Screw – Structural, Washer Head	10.3	13	1	1
AN960-816	Washer, Flat	10.3	14	2	
MD35489-9	Grommet	10.3	15	1	1
AN100C-4	Thimble	10.3	16	1	1
6151	Release Handle Assembly	10.2	17	AR	AR
1060-01	Placard, Glider Towing	10.2	18	1	1
1060-02	Placard, Banner Towing	10.2	19	1	1

Numerical Index: PATH Tow Hook Installation for Aeronca
Figure 10.1

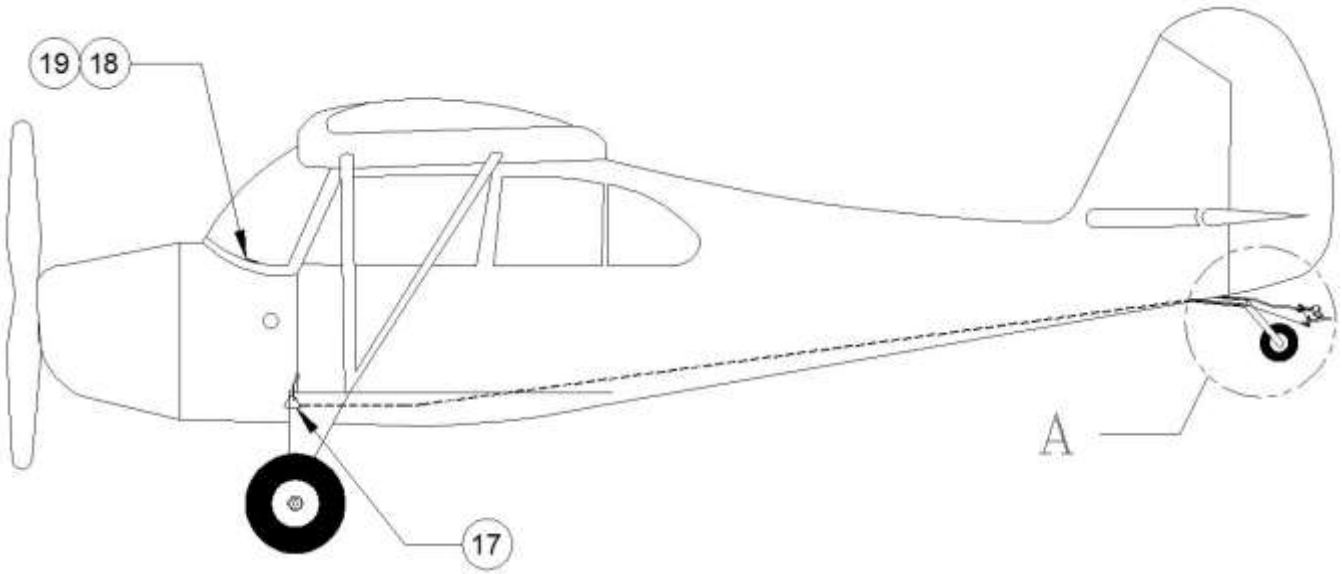

Figure 10.2: PATH Tow Hook Installation for Aeronca (Aeronca 7AC Shown)

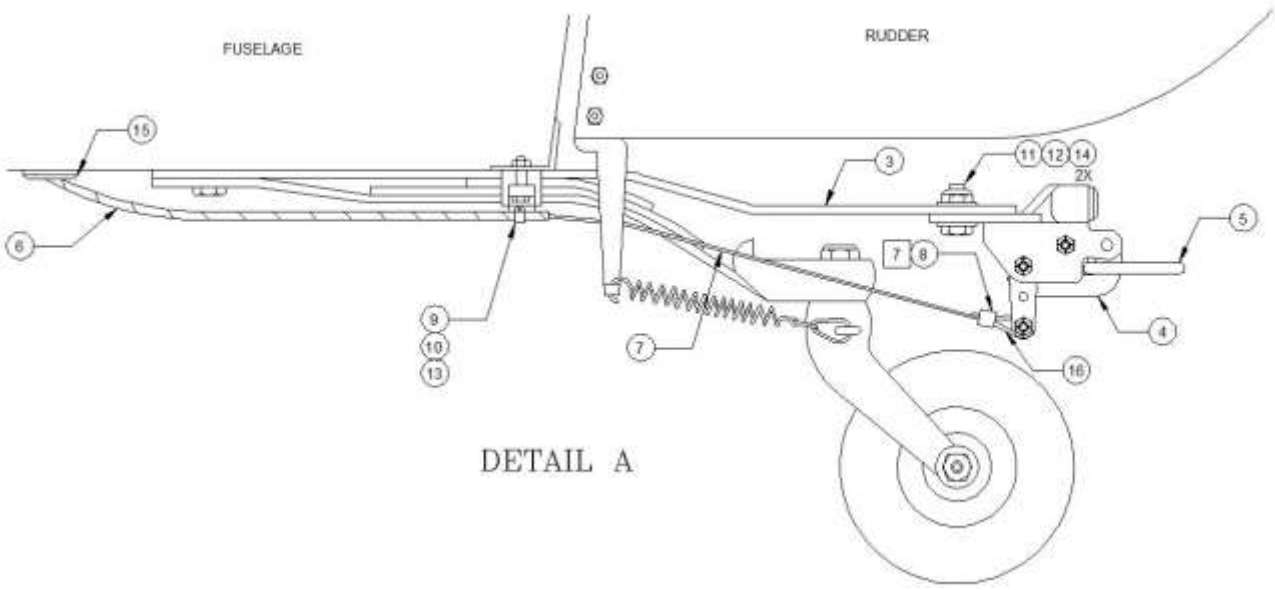

Figure 10.3: PATH Tow Hook Installation for Aeronca, Detail A

11. PATH Tow Hook Installation for Cessna Models 180 & 185, 1290

Part Number	Description	Fig.	Item	-01 Qty. Req.	-02 Qty. Req.
1290-01	PATH Tow Hook Installation for Cessna Models 180 & 185		1	X	
1290-02	PATH Tow Hook Installation for Cessna Models 180 & 185		2		X
1291	PATH Tow Bar for Cessna 180 & 185	11.3	3	1	1
6030	Tow Hook – Lug with Stop	11.3	4	1	
6029	Tow Hook Assembly with Mounting Lug	11.3	4	ALT	
6028	Tow Hook with Stop	11.3	4		1
6027	Tow Hook Assembly	11.3	4		ALT
6131	Tow Ring	11.3	5	1	1
1000	Tow Link – Safety	11.3	5	ALT	ALT
05-00115	Nylaflow Tubing	11.3	6	AR	AR
Cable .094, SS	Aircraft Cable 7 x 7	11.3	7	AR	AR
MS51844-23	Nicopress Sleeve	11.3	8	1	1
MS21919DG-4	Adel Clamp	11.3	9	1	1
AN5-32A	Bolt	11.3	10	2	2
AN8-11A	Bolt	11.3	11	1	
AN365-820	Nut	11.3	12	1	
AN960-516	Washer, Flat	11.3	13	AR	AR
AN365-524	Nut	11.3	14	2	2
AN960-816	Washer, Flat	11.3	15	2	
MS35489-9	Grommet	11.3	16	1	1
AN100C-4	Thimble	11.3	17	1	1
AN525-10R6	Screw – Structural, Washer Head	11.3	18	1	1
AN365-1032A	Nut	11.3	19	1	1
6151	Release Handle Assembly	11.2	20	AR	AR
1060-01	Placard, Glider Towing	11.2	21	1	1
1060-02	Placard, Banner Towing	11.2	22	1	1

Numerical Index: PATH Tow Hook Installation for Cessna Models 180 & 185
Figure 11.1

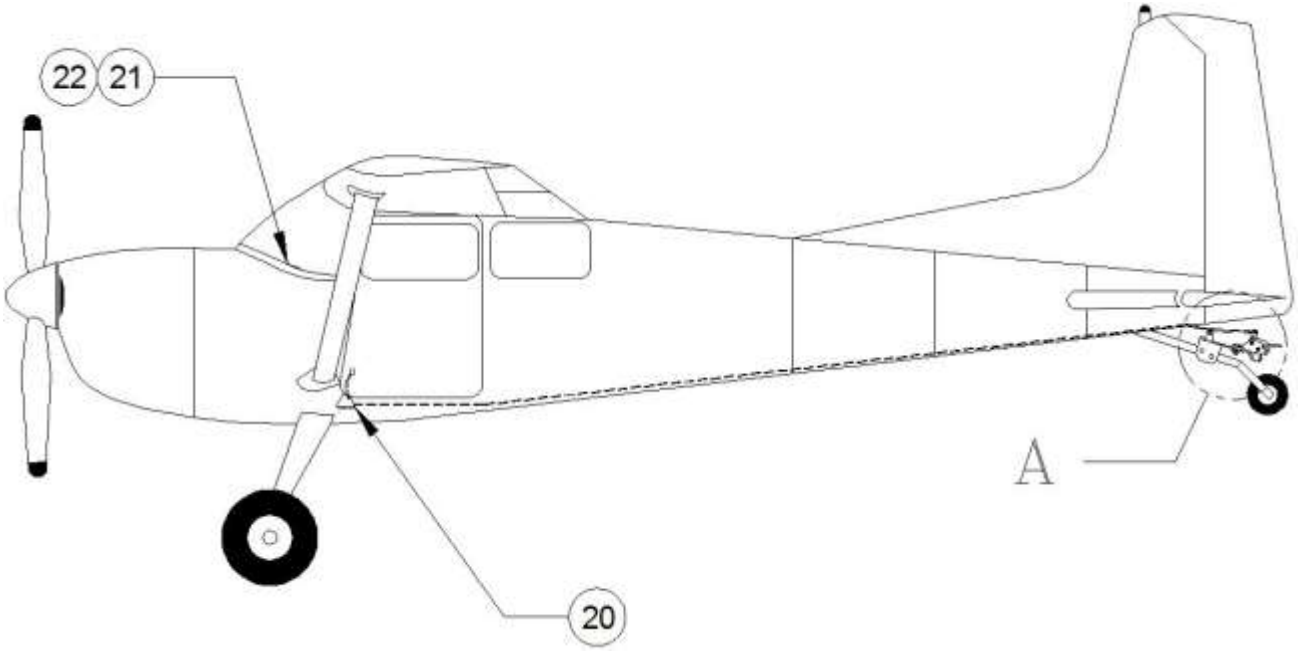

Figure 11.2: PATH Tow Hook Installation for Cessna Models 180 & 185 (Cessna 180 Shown)

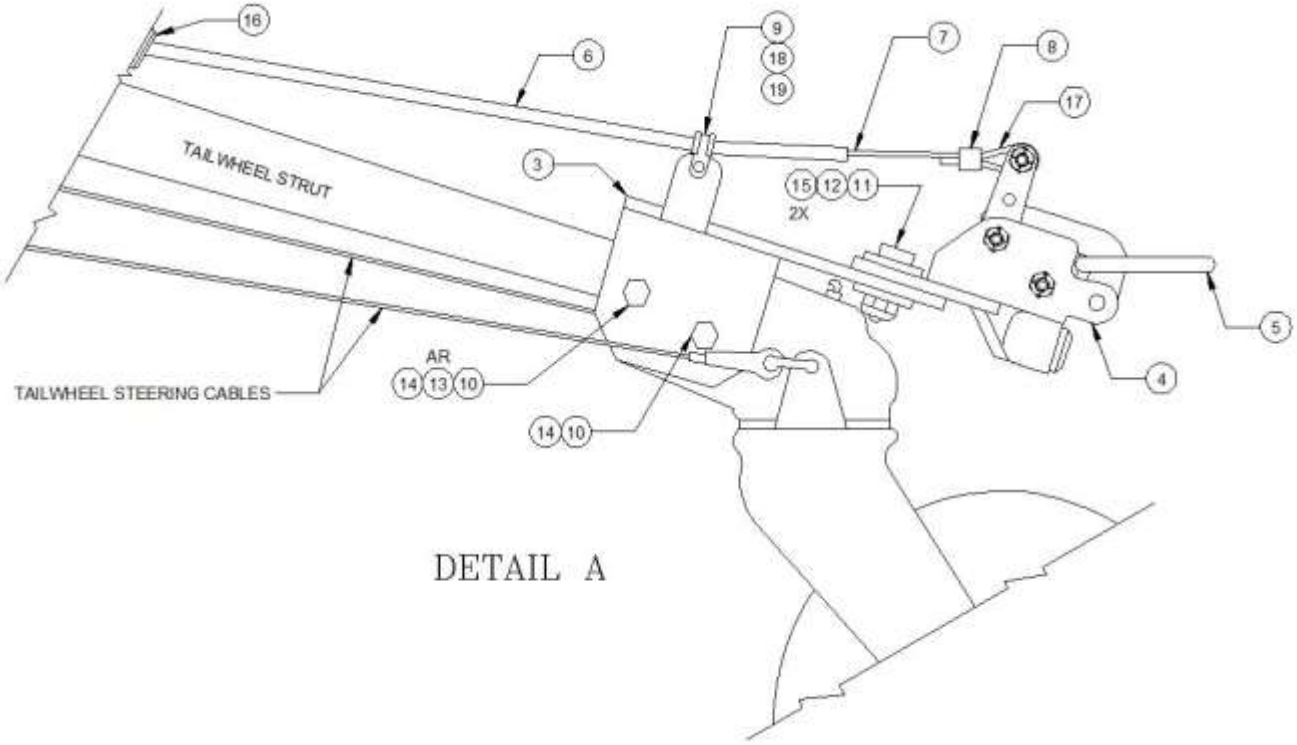

Figure 11.3: PATH Tow Hook Installation for Cessna Models 180 & 185, Detail A

12. Release Subassembly, 6025

Part Number	Description	Fig.	Item	Qty. Req.
6025	Release Subassembly		1	X
6016*	Release Strap	12.2	2	2
6013*	Bushing; Tow Hook	12.2	3	2
6014*	Bushing	12.2	4	1
6015*	Roller; Tow Hook	12.2	5	2
AN3-6A	Bolt	12.2	6	1
MS21044N3	Nut	12.2	7	1
MS20615-6M9*	Rivet	12.2	8	1

* - Parts not available for replacement – order complete assembly.
Numerical Index: Release Subassembly
Figure 12.1

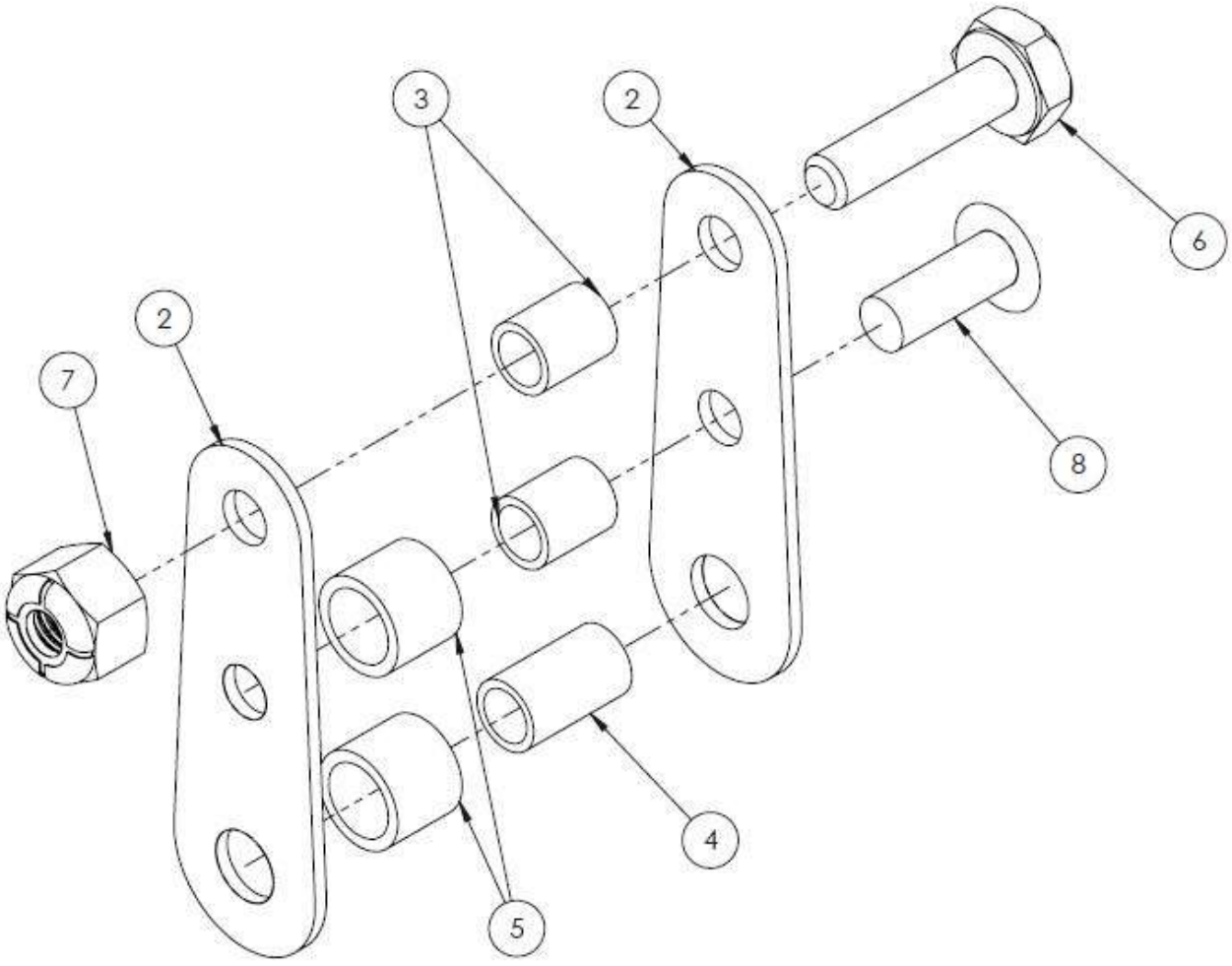

Figure 12.2: Release Subassembly

13. Tow Hook Assembly, 6027

Part Number	Description	Fig.	Item	Qty. Req.
6027	Tow Hook Assembly		1	X
6022	Housing/Hook Sub Assembly	13.2	2	1
6017	Rubber Spring	13.2	3	1
AN3-7A	Bolt	13.2	4	2
MS21044N3	Nut	13.2	5	2
6025	Release Subassembly	13.2	6	1
6014	Bushing	13.2	7	1

Numerical Index: Tow Hook Assembly
Figure 13.1

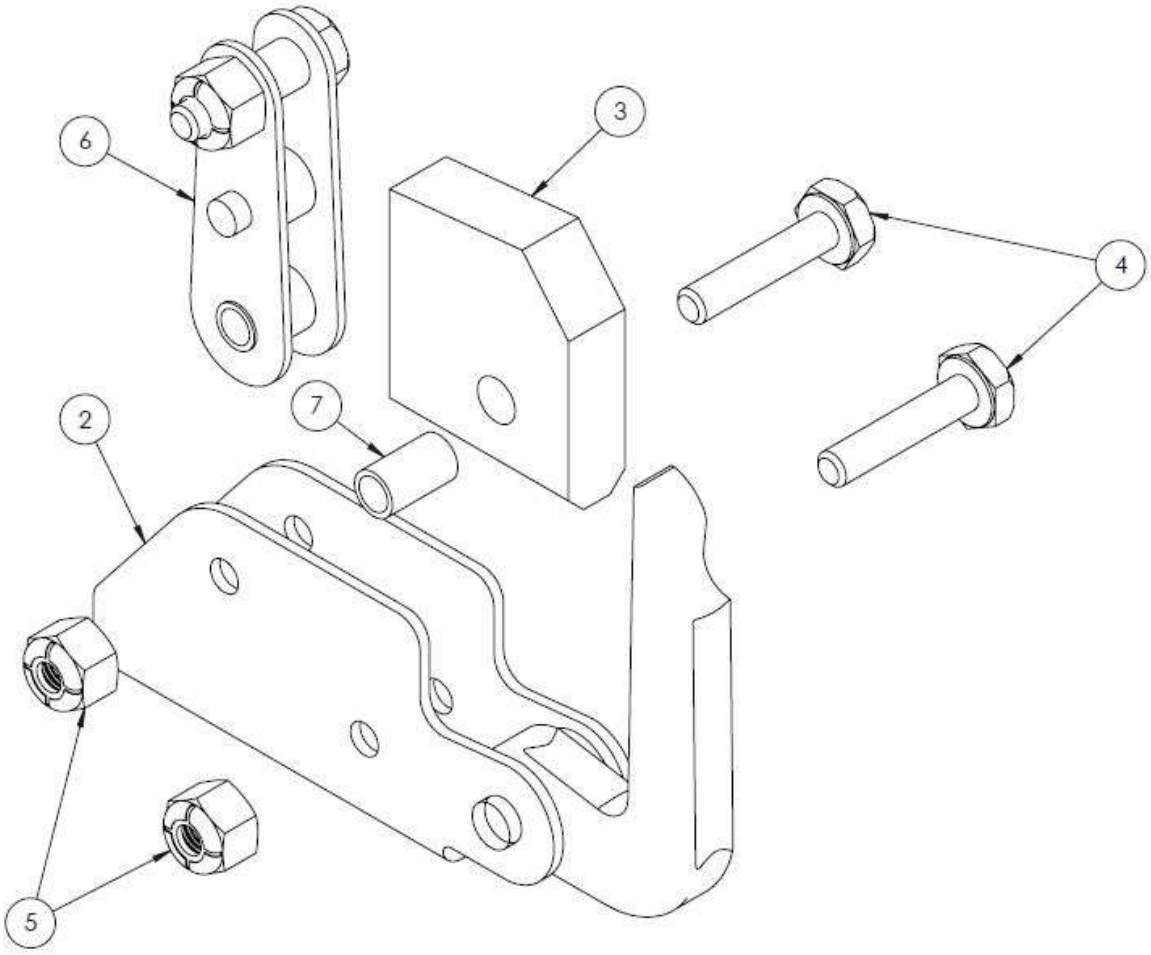

Figure 13.2: Tow Hook Assembly

14. Tow Hook with Stop, 6028

Part Number	Description	Fig.	Item	Qty. Req.
6028	Tow Hook with Stop		1	X
6017	Rubber Spring	14.2	2	1
AN3-7A	Bolt	14.2	3	2
MS21044N3	Nut	14.2	4	2
6025	Release Subassembly	14.2	5	1
6014	Bushing	14.2	6	1
6051	Housing with Stop	14.2	7	1
6046	Stop Bumper	14.2	8	1
6049	Rivet	14.2	9	1

Numerical Index: Tow Hook with Stop
Figure 14.1

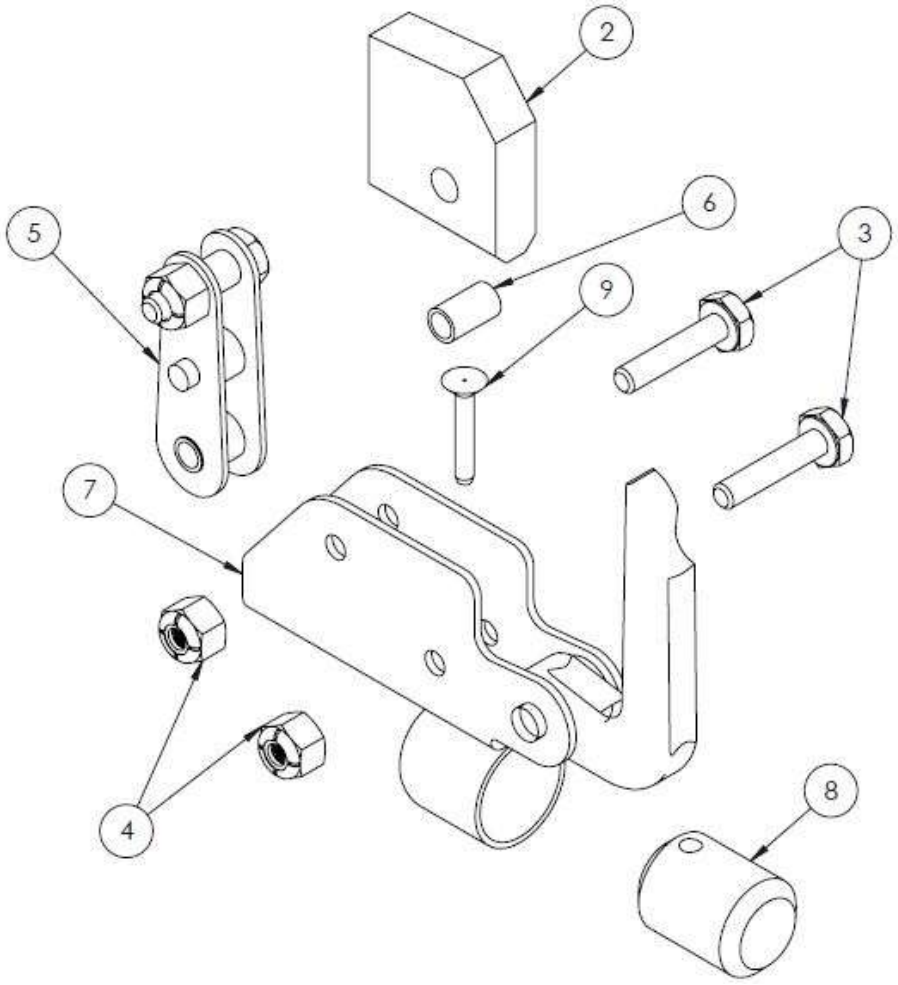

Figure 14.2: Tow Hook with Stop

15. Tow Hook Assembly with Mounting Lug, 6029

Part Number	Description	Fig.	Item	Qty. Req.
6029	Tow Hook Assembly with Mounting Lug		1	X
6024	Tow Hook Assembly	15.2	2	1
6017	Rubber Spring	15.2	3	1
AN3-7A	Bolt	15.2	4	2
MS21044N3	Nut	15.2	5	2
6025	Release Subassembly	15.2	6	1
6014	Bushing	15.2	7	1

Numerical Index: Tow Hook Assembly with Mounting Lug
Figure 15.1

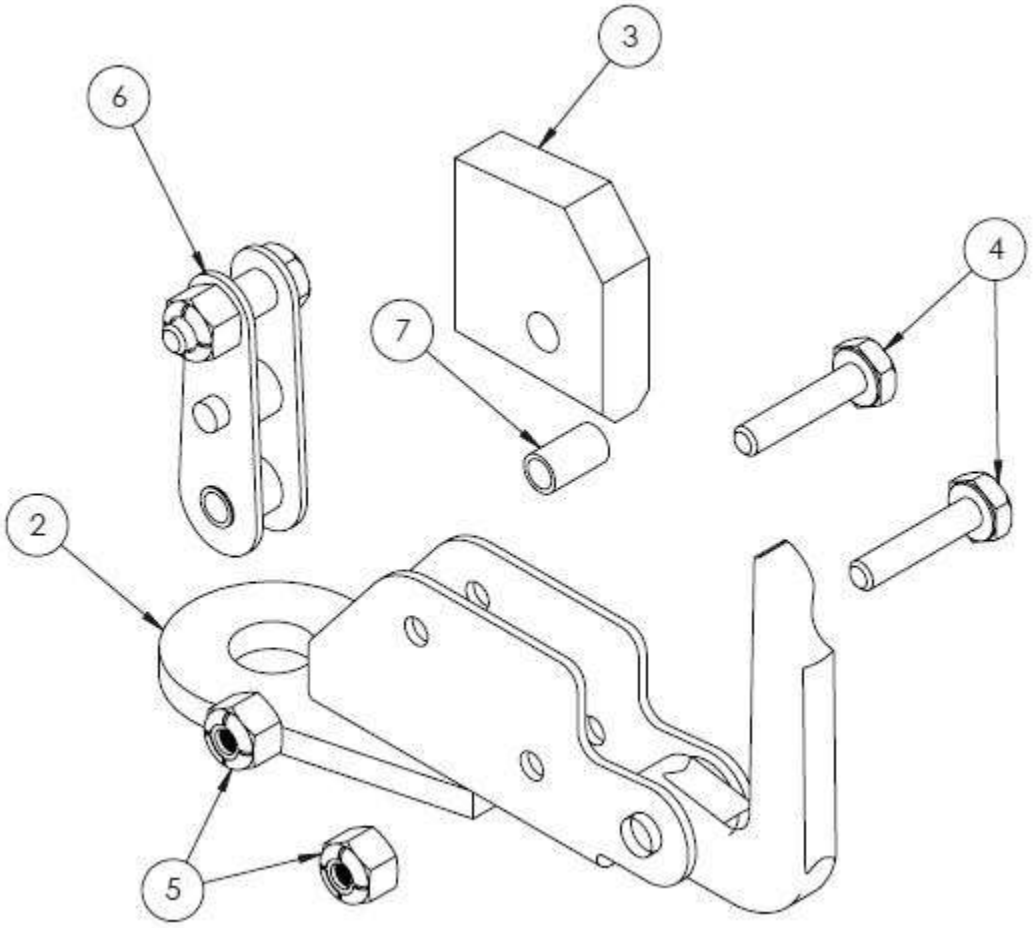

Figure 15.2: Tow Hook Assembly with Mounting Lug

16. Tow Hook/Lug with Stop, 6030

Part Number	Description	Fig.	Item	Qty. Req.
6030	Tow Hook/Lug with Stop		1	X
6017	Rubber Spring	16.2	2	1
AN3-7A	Bolt	16.2	3	2
MS21044N3	Nut	16.2	4	2
6025	Release Subassembly	16.2	5	1
6014	Bushing	16.2	6	1
6050	Housing with Lug and with Stop	16.2	7	1
6046	Stop Bumper	16.2	8	1
6049	Rivet	16.2	9	1

Numerical Index: Tow Hook/Lug with Stop
Figure 16.1

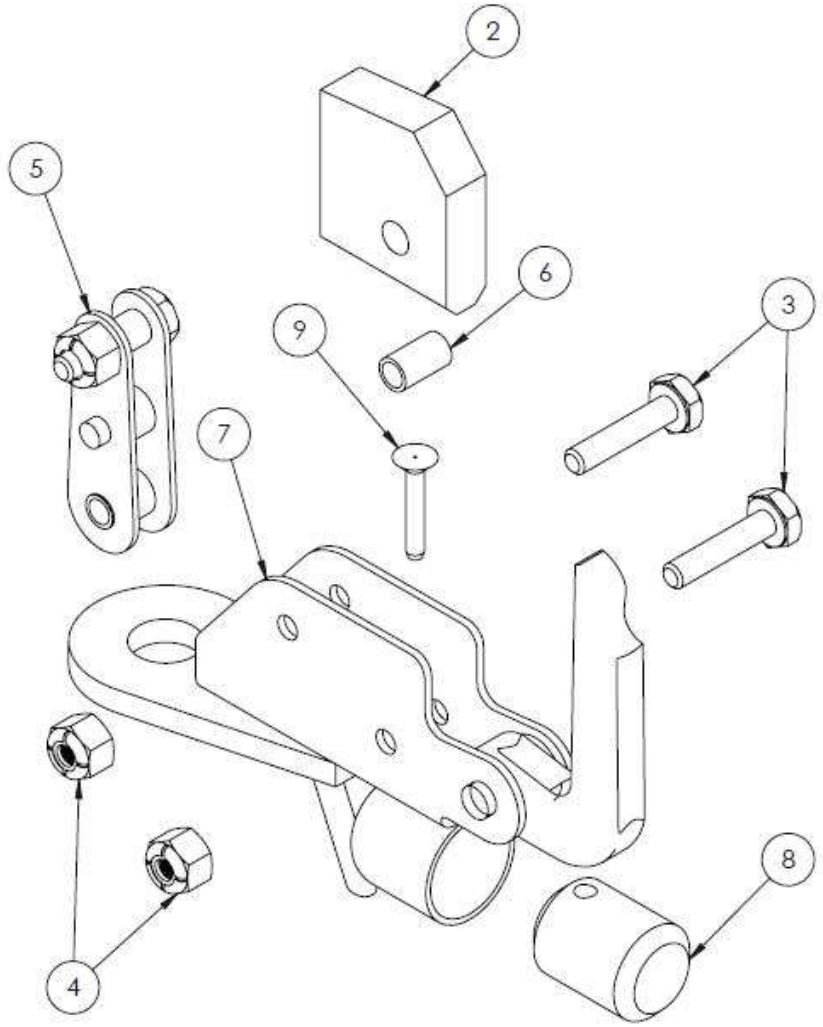

Figure 16.2: Tow Hook/Lug with Stop

17. Release Handle, 6140

Part Number	Description	Fig.	Item	Qty. Req.
6140	Release Handle		1	X
6141	Release Handle - Handle	17.2	2	1
6143	Release Handle - Bushing	17.2	3	1
6144	Release Handle - Placard	17.2	4	1
9001	Phenolic Ball Knob	17.2	5	1

Numerical Index: Release Handle
Figure 17.1

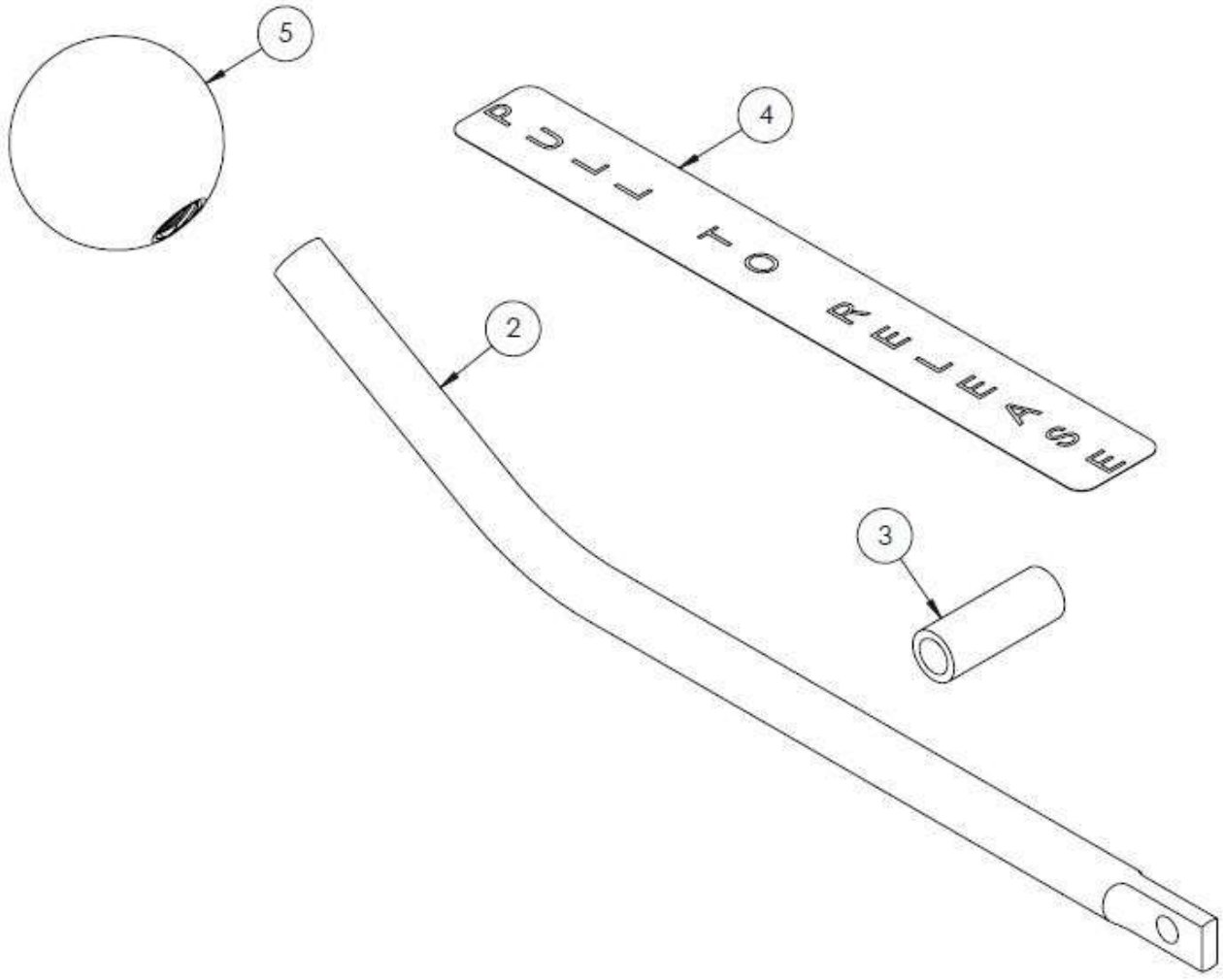

Figure 17.2: Release Handle

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