

Towing Trailers Successfully



**This document may have been updated
Be sure to download the latest version!**

Updated: January 1, 2026

PLEASE NOTE

This document may have been updated with new information, changes, or corrections.

Be sure to visit my presentation web site and download the latest version of this document. It could make an important difference in your work!

<http://aviation.derosaweb.net/presentations>

Thank you, John

Table of Contents

- ❑ Introduction
- ❑ **Don't Let This Happen to You**
- ❑ Basic Trailer/Vehicle Components
- ❑ Chains and Hooks
- ❑ Crossing Your Chains
- ❑ Hardware - Shackles and such
- ❑ Coupler Locks
- ❑ **Critical Hints**
- ❑ Trailering Regulations Per US State (with links)
- ❑ Internet Resources
- ❑ Other Trailer Information:
 - ❖ Wiring - <https://aviation.derosaweb.net/presentations/#trailerwiring>
 - ❖ Ramps - <https://aviation.derosaweb.net/presentations/#trailerramps>
 - ❖ Manuals - <http://aviation.derosaweb.net/trailer/>

My Back Story

My story begins driving back from Utah in 2013. I was traveling at 60+ miles an hour in a highway construction area in downtown Omaha, Nebraska. I suddenly felt my glider trailer doing a rather wild dance. What is going on?

I looked in my rearview mirror and saw my trailer was moving violently side to side. It took me a second or two to realize that my trailer's coupler had **COME OFF THE TOW BALL!!** Holy @\$%!

Steer straight! Let off on the gas! NO BRAKING! Slowly pulled over.

I was very lucky that day. I was lucky that the trailer didn't completely disconnect from the tow vehicle. I was lucky the trailer didn't topple end-over-end. I was lucky I wasn't pulled violently into the guardrail. I was lucky that my glider wasn't destroyed. I was lucky that I wasn't hurt. I was so very lucky that innocent nearby bystanders weren't injured ... or worse.

I WAS TRULY LUCKY THAT DAY. What saved me that day in Omaha from disaster were the strong towing equipment that connected my vehicle to my trailer and **ESPECIALLY MY STOUT CHAINS!**

So, how good is YOUR trailer's equipment?

Introduction

You just purchased a glider that you are so very proud of. It cost you many months worth of your hard-earned money. The trailer it came in is now attached to a vehicle that also cost you many months of hard-earned money. And your precious cargo ... YOU!

These rather valuable pieces of property are connected to one another with what might be the cheapest, weakest, rustiest, hardware possible. Does this make any sense at all?

Of course, the answer is obviously “NO!”. Maybe you truly have connected the vehicle and trailer with what you believe is a safe and robust assemblage of components. Are you sure?

By taking some time, and with the advice of this presentation, you will make sure that your next “soaring safari” ends up as happily as you felt when you bought that new glider trailer in the first place.

Don't Let This Happen To You



Trailer Accidents Video: <https://www.youtube.com/watch?v=iCDt4tjxp-E>

Don't Let This Happen To You



Trailer Accidents Video: <https://www.youtube.com/watch?v=iCDt4tjxp-E>

Don't Let This Happen To You



Trailer Accidents Video: <https://www.youtube.com/watch?v=iCDt4tjxp-E>

Assumptions for this Presentation

As part of this presentation I will assume that your trailer and vehicle is already equipped with the following minimum requirements

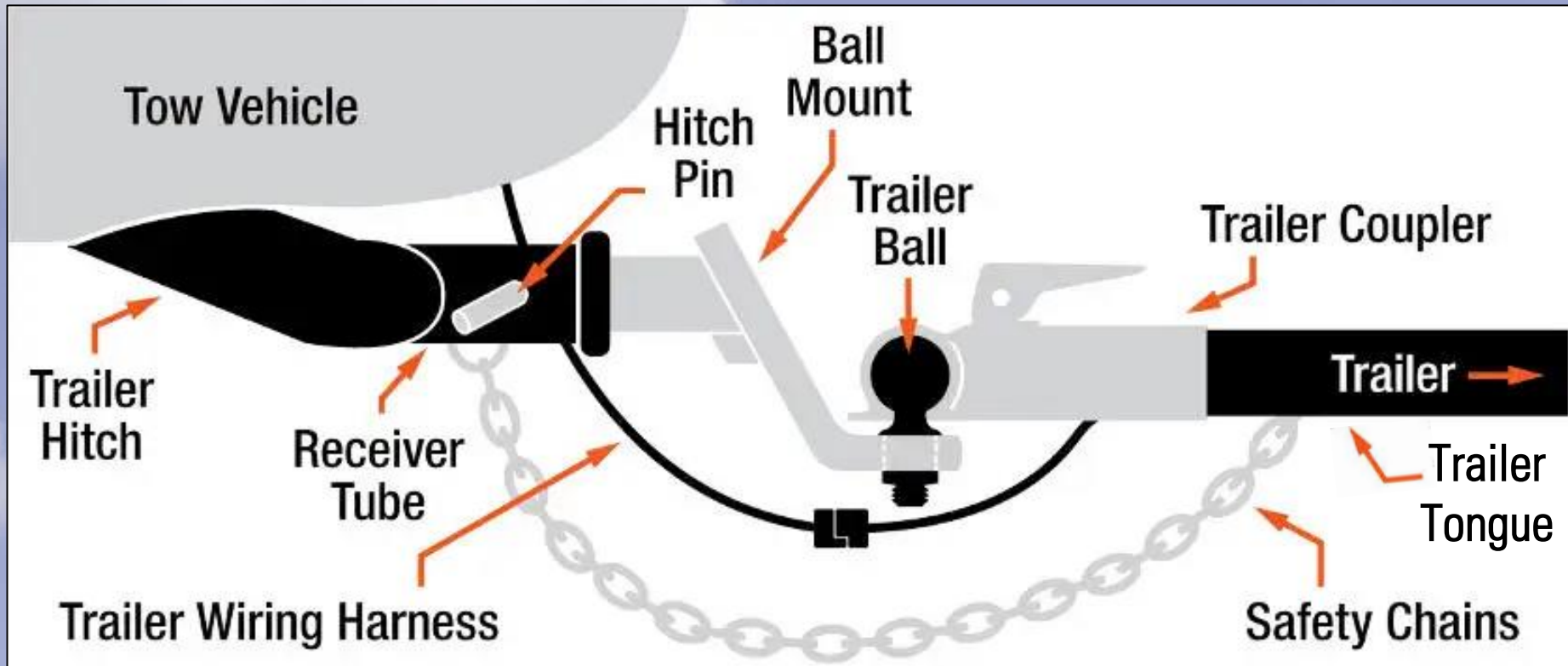
The following topics WILL NOT be discussed in this presentation

- 1) Trailer safety and licensing compliance for your jurisdiction
- 2) Vehicle towing capacity/hitch/receiver for your trailer's weight
- 3) Ball mounts with the appropriate "drop" for your trailer
- 4) Ball sizing for your trailer's coupler (2", 50mm, etc)
- 5) Trailer properly sized coupler (2", 50mm, etc)
- 6) Trailer braking mechanisms (electric or mechanical)
- 7) Vehicle and trailer lighting and wiring connections *

If you do not have all of these items in place, or to the incorrect capacity, or you are unsure if you do, you should contact your local trailer accessory dealer and make things right!

* For more details on trailer wiring see my presentation:
<http://aviation.derosaweb.net/presentations/#trailerwiring>

Trailer/Vehicle Components and Nomenclature



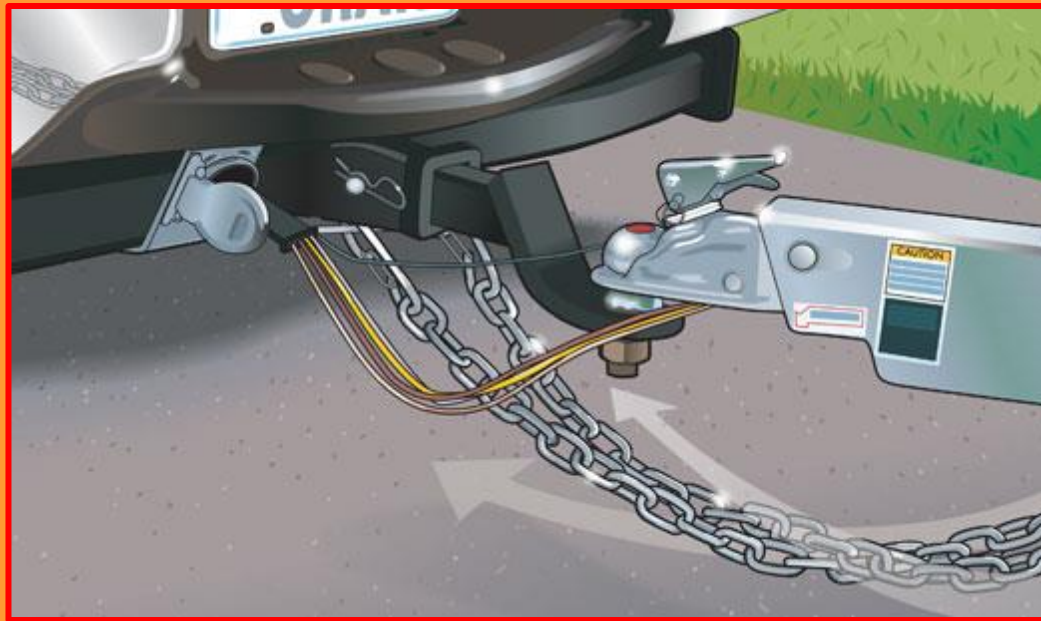
NOTE: Every State in the U.S.A. requires chains to be used on all trailers! See a later slide for trailering regulations per US State (with links)

“Chains are Only as Strong as the Weakest Link”

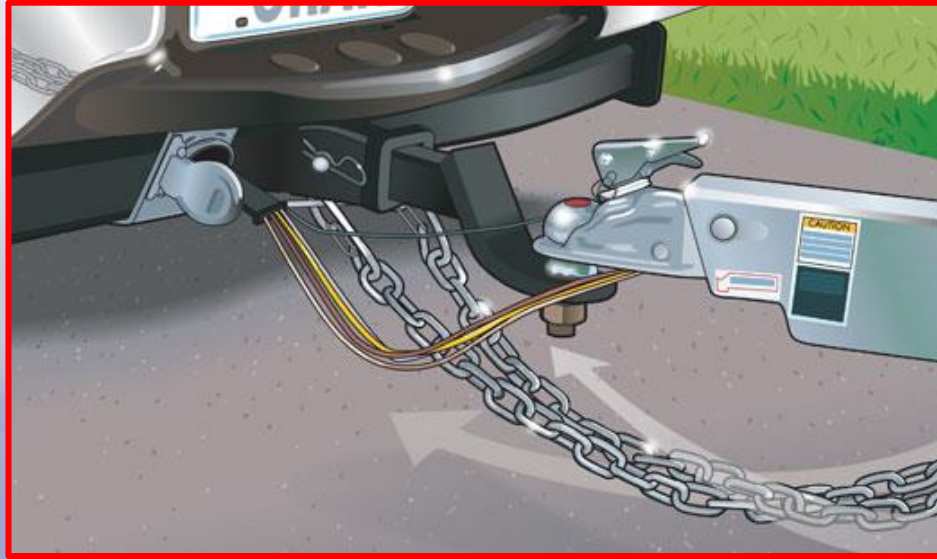


Critical Hint #1

Strong Chains Saves Lives!!



Strong Chains Saves Lives!!



When a trailer separates from the vehicle things can turn deadly in a hurry.

Lots of things can cause a failure of the connection between your vehicle and the trailer. The coupler coming releasing the ball, the ball separating from the ball mount, the trailer's tongue failing, and the chains may break.

That being said the most important of all of these items are your chains.
As long as your chains are as strong as possible then your trailer will, in all probability, remain connected to your vehicle.

Source: <https://nationaltrailerparts.com/2020/02/07/safety-chains>

Lousy Chains That I have Seen That GREATLY Worry Me



Trailer Chains

“Chains are Only as Strong as the Weakest Link”

Let's start with the basics - your chains. If your trailer becomes detached from your vehicle it will exert a **TREMENDOUS impact force** on your chains as they become taut in your emergency.

Choose chains that are **STRONGER** than the total weight of your trailer. I personally like to use chains that are **2-3 times** as required. This is very cheap insurance indeed.

Attach safety chains to the trailer and vehicle in a way that is stronger than the chain. Also, all the other parts, hooks/connections/hitch/etc, must also be as strong as the chain.

Choosing Trailer Chain

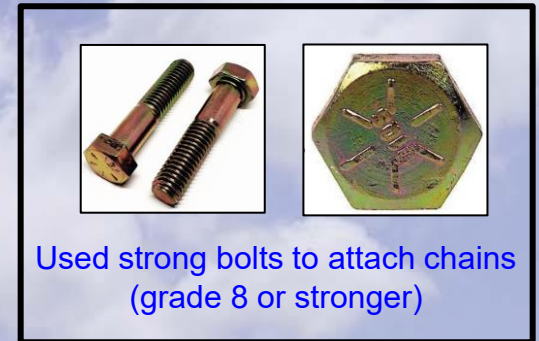
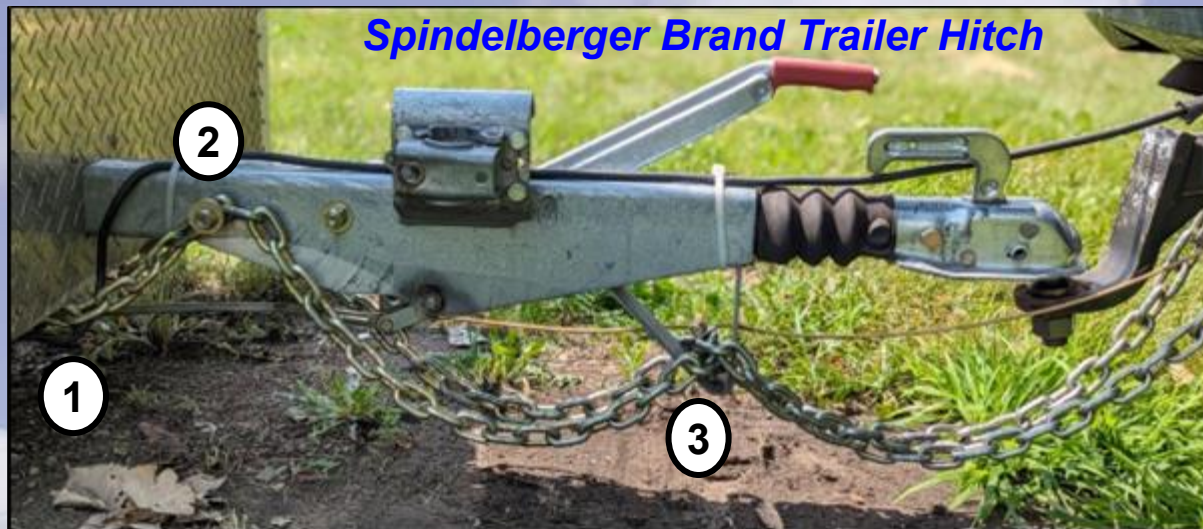
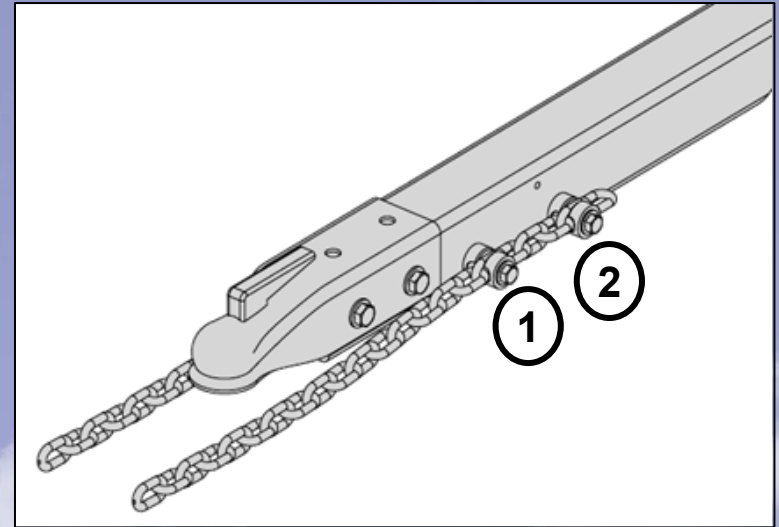
Chains come in many different strength ratings.. Shown here are chains rated from lowly 800 to 6600 lbs. **At a minimum purchase chains that are rated 1-2 times stronger than the trailer's Gross Vehicle Weight Rating (GVWR).**



Attaching Chains to Your Trailer

Many trailers have the chains attached in only one place. I believe that attaching chains to the trailer in more than one location is the best plan.

Attaching chains in multiple places adds critical redundancy so that if one bolt breaks then the others can help to save the day!



Used strong bolts to attach chains
(grade 8 or stronger)

Sources: <https://mechanicalelements.com/how-to-attach-safety-chains>
<https://mechanicalelements.com/improving-safety-chains-attach-connections>

Connecting Chains to Your Vehicle's Hitch

CHAINS MUST NEVER DRAG ON THE GROUND!!

You should always use safety chains with hooks **that have spring latches**.

This helps prevent the hook from departing the vehicle on rough roads.

Hook with spring latch



Good - Standard Clip On



Best - Loop Through

Connecting Chains to Your Vehicle's Hitch

There are times where the vehicle's hitch's "loops" are too small to allow your chains to fit through.

In that case the use of strong quick links or shackles can be used to allow room for the chain to fit through.



TERRIBLE! Snap Link
Maximum 350 lbs.

BETTER! Quick Links
Maximum 3,250 lbs.

BEST! Shackles
Maximum 6,000 lbs.



Use of Chains Versus Safety Cables

While convenient these coiled cables have the same issue as chains that are too long.

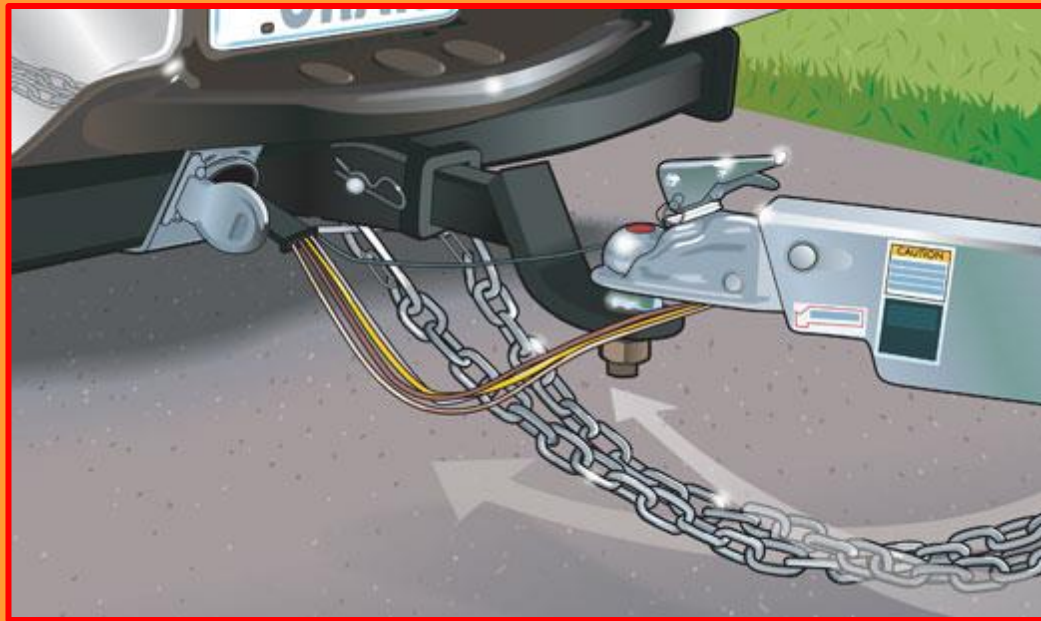
Reason: If the coupler comes off the ball the extra length of the cable greatly increases the impact force which can then break the connection between the vehicle and the trailer



<https://pacifictailers.com/blogs/boat-trailer-tips-advice/safety-chains-vs-safety-cables>

Critical Hint #2

ALWAYS CROSS YOUR CHAINS!!



ALWAYS CROSS YOUR CHAINS!!

Chains must be always “**crossed over**” each other under the coupler between the trailer and the vehicle.

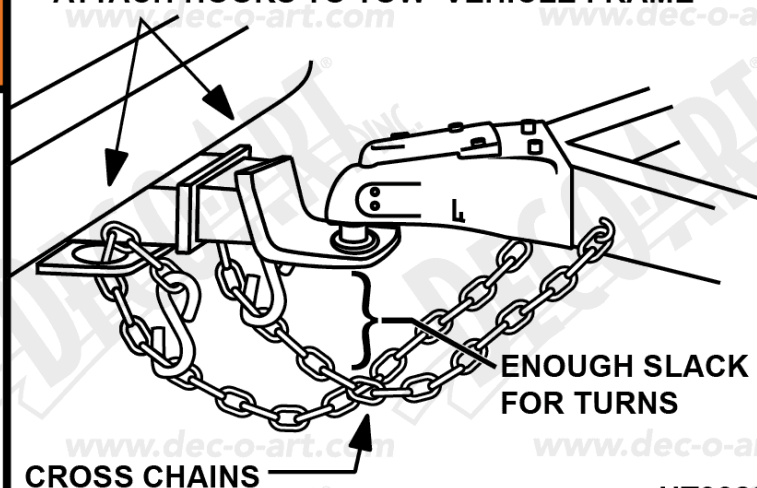
WARNING

ALWAYS use safety chains.
Chains hold trailer if connection fails.
You must:

1. **CROSS** chains underneath coupler.
2. **ALLOW** slack for trailer to turn.
3. **ATTACH** chain hooks securely to tow vehicle frame.

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ATTACH HOOKS TO TOW VEHICLE FRAME

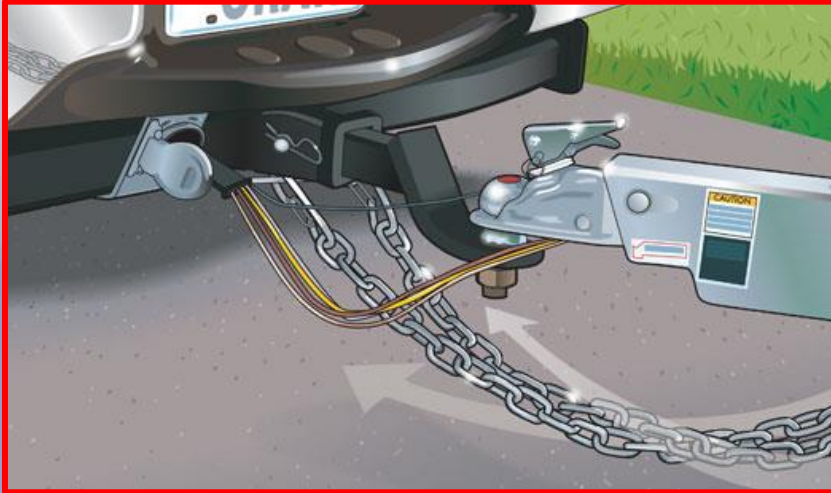


UT0020

Source: <https://nationaltrailerparts.com/2020/02/07/safety-chains>

Video: https://www.youtube.com/results?search_query=trailer+chains+crossed

Always Cross Your Chains



If the trailer's coupler were to disconnect from the vehicle's ball the crossed chains will capture the trailer's coupler/tongue and prevent it from dropping to the ground.

If the coupler/tongue were to drop to the ground, it can catch a gap in the roadway.

When that happens, the trailer WILL stop very sharply and WILL break the chains!



Crossed chains shown holding the disconnected coupler off of the ground

Critical Hint #3

Always Lock the Coupler



Coupler Simple Pin



Coupler Locking Pin



Cobra Al-Ko Euro Lock

Locking the Coupler to the Ball

You MUST always lock the coupler to the ball to prevent the coupler from releasing from the ball during transport

Capturing Pin for a
Standard US Coupler

Coupler Simple Pin

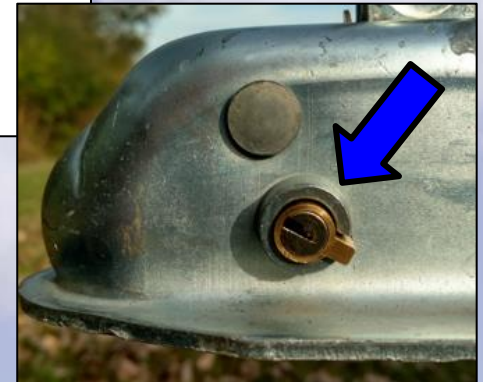


Coupler Locking pin



Lock for a Cobra Trailer
Al-Ko Euro Coupler

Cobra Lock



Al-Ko Lock US Source:

<https://wingsandwheels.com/cobra-coupler-lock-keys.html>

Critical Hint #4

**Always Use The
Correct Sized Ball!!**



Common Sizes of Trailer Balls

- ❑ **1-7/8"** - For light loads like small utility trailers, jet skis, or pop-up campers.
- ❑ **2"** - The most versatile size, used for medium loads such as boat trailers, small cargo trailers, and typical travel trailers.
- ❑ **2-5/16"** - For heavy-duty towing, including large RVs, horse trailers, and equipment haulers.
- ❑ **3"** - A niche size for very heavy commercial or industrial applications.
- ❑ **50mm** – Found on European trailers such as Cobra

Warning About Mismatched Sizes of Couplers and Balls!

NEVER mix 50mm and 2" equipment

It May Seem Correct – BUT IT ISN'T



50mm Coupler on a 2" Ball

Difference: +0.8mm *TOO TIGHT!*

Friction can unscrew the ball from the ball mount or jam the ball into the coupler

2" Coupler on a 50mm Ball

Difference: -0.8mm *TOO LOOSE!*
The coupler could release the ball

Critical Hint #5

**Use The Correct Chain Length!
& Never Let the Chains Drag!**



Proper Length of the Chains

To prevent damage to the chains they should be a **Minimum of 5" off the ground.**

Chains should be **just long enough without** the chains becoming taut during sharp turns.

NEVER allow the chains to drag on the ground.



See the next slides on the **right** and **wrong** ways to shorten chains that are too long

Sources: <https://mechanicalelements.com/ways-to-shorten-a-chain/>
<https://www.youtube.com/watch?v=QMeqZFDFCaI>

The **WRONG!** Ways to Shorten Chains

Hanging the Chains

Reason: If the coupler comes off the ball the extra length of chain will come loose increasing the disconnect impact force which can break the chains and the connection between the vehicle and the trailer



Twisting the Chains

Reason: Twisting weakens the chains. See the link below.

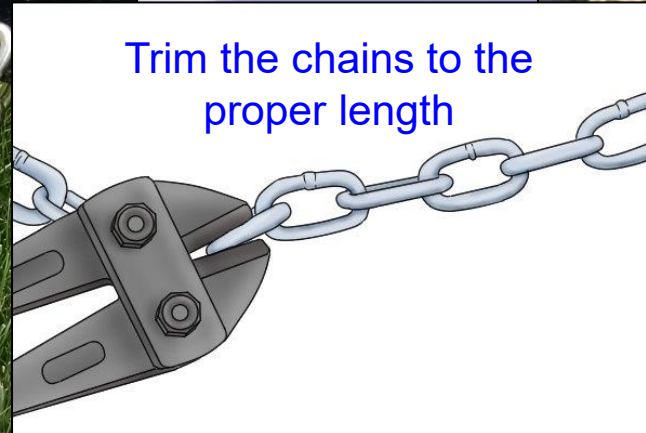
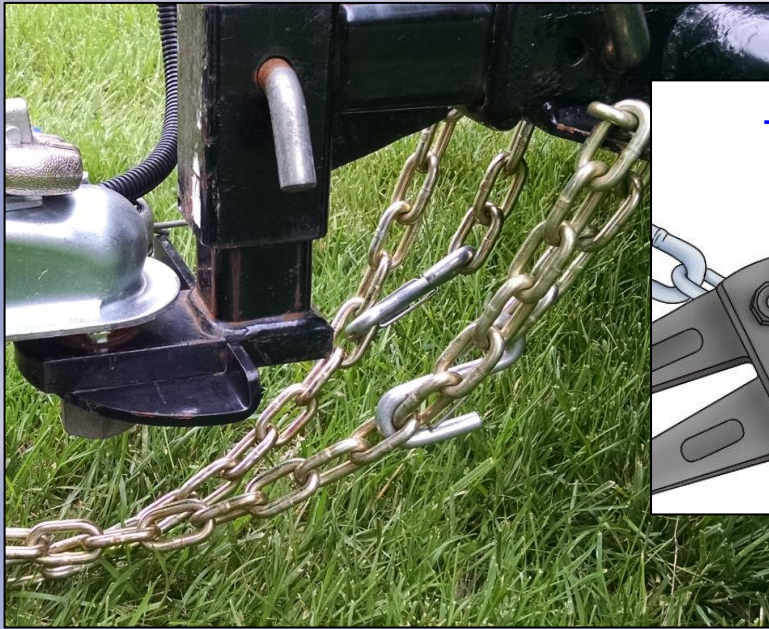


Source: <https://mechanicalelements.com/twisting-safety-chains/>

The **RIGHT!** Way to Shorten Chains

Loop the chain through the hitch and hooked it onto itself

Take up the chain's slack with a Double Clevis link



Sources: <https://mechanicalelements.com/ways-to-shorten-a-chain/>
<https://mechanicalelements.com/twisting-safety-chains/>

NEVER WELD CHAINS TO THE TRAILER!

Reason: The process of welding applies high heat to the chain links which greatly weakens them. It also makes it more difficult to replace the chains.



Critical Hint #6

Know Your State's Trailer Rules



Trailing Regulations Per Each US State

☐ Alabama

<https://alison.legislature.state.al.us/code-of-alabama?section=32-9-1>

☐ Alaska

<http://www.touchngo.com/lglcntr/akstats/aac/title13/chapter004/section275.htm>

☐ Arizona

<https://www.azleg.gov/viewDocument/?docName=https://www.azleg.gov/ars/28/00981.htm>

☐ Arkansas

<https://law.justia.com/codes/arkansas/2010/title-27/subtitle-3/chapter-35/subchapter-1/27-35-111/>

☐ California

<http://codes.findlaw.com/ca/vehicle-code/veh-sect-29004.html>
<http://www.eyershitch.com/california-towing-laws.html>

☐ Colorado

<https://law.justia.com/codes/colorado/2016/title-42/regulation-of-vehicles-and-traffic/article-4/part-5/section-42-4-506/>

☐ Connecticut

<https://eregulations.ct.gov/eRegsPortal/Browse/RCSA?id=Title%2014|14-137|14-137-124|14-137-124>
<http://www.ct.gov/dmv/cwp/view.asp?a=804&q=244914>

State by State List Curtesy of Piet Barber - Please Advise Corrections

Trailing Regulations Per Each US State

❑ Delaware

<http://delcode.delaware.gov/title21/c043/sc01/index.shtm>

https://www.dmv.de.gov/services/vehicle_services/other/ve_other_general.shtml

[https://www.dmv.de.gov/forms/veh_serv_forms/pdfs/Vehicle Inspection Manual.pdf?022516](https://www.dmv.de.gov/forms/veh_serv_forms/pdfs/Vehicle_Inspection_Manual.pdf?022516)

❑ Florida

http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0300-0399/0316/Sections/0316.530.html

<https://www.law.cornell.edu/cfr/text/49/393.71>

❑ Georgia

<http://www.legis.ga.gov/Legislation/20152016/146112.pdf>

<http://www.legis.ga.gov/Legislation/20152016/153467.pdf>

https://www.boat-ed.com/georgia/studyGuide/Trailer-Safety-Chains/10101102_700139976/

❑ Hawaii

<http://hidot.hawaii.gov/highways/files/2017/12/Rules-Amending-Title-133-2-10-12-17.pdf>

❑ Idaho

<https://legislature.idaho.gov/statutesrules/idstat/title49/t49ch9/>

State by State List Curtesy of Piet Barber - Please Advise Corrections

Trailing Regulations Per Each US State

☐ Illinois

<https://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=062500050K15-107>

☐ Indiana

<http://codes.findlaw.com/in/title-9-motor-vehicles/in-code-sect-9-20-9-8.html>

☐ Iowa

<https://www.legis.iowa.gov/docs/iacode/2001/321/462.html>

☐ Kansas

<http://www.kscoplaw.com/vehcode/art19.html>

☐ Kentucky

<http://www.lrc.ky.gov/Statutes/chapter.aspx?id=38038>

☐ Louisiana

<https://law.justia.com/codes/louisiana/2011/rs/title32/rs32-384/>

☐ Maine

<http://legislature.maine.gov/legis/statutes/29-A/title29-Asec2385.html>

☐ Maryland

<http://mgaleg.maryland.gov/webmga/frmStatutesText.aspx?pid=&tab=subject5&stab=&ys=2017RS&article=gtr§ion=24-107&ext=html&session=2017RS>

☐ Massachusetts

<https://www.mass.gov/files/documents/2017/10/19/540cmr22.pdf>

State by State List Courtesy of Piet Barber - Please Advise Corrections

Trailing Regulations Per Each US State

☐ Michigan

[http://www.legislature.mi.gov/\(S\(ppmbfkxrptwij10eqkmype0f\)\)/mileg.aspx?page=GetObject&objectname=mcl-257-721](http://www.legislature.mi.gov/(S(ppmbfkxrptwij10eqkmype0f))/mileg.aspx?page=GetObject&objectname=mcl-257-721)

☐ Minnesota

<https://www.revisor.mn.gov/statutes/?id=169.82>

☐ Mississippi

<https://law.justia.com/codes/mississippi/2010/title-63/5/63-5-25>

☐ Missouri

<https://law.justia.com/codes/missouri/2005/t19/3070000170.html>

☐ Montana

http://leg.mt.gov/bills/mca/title_0610/chapter_0090/part_0020/section_0080/0610-0090-0020-0080.html

☐ Nebraska

<http://codes.findlaw.com/ne/chapter-60-motor-vehicles/ne-rev-st-sect-60-6-246.html>

☐ Nevada

<https://www.leg.state.nv.us/register/2004Register/R046-04A.pdf>

☐ New Hampshire

https://www.lawserver.com/law/state/new-hampshire/nh-statutes/new_hampshire_revised_statutes_266-63

State by State List Curtesy of Piet Barber - Please Advise Corrections

Trailing Regulations Per Each US State

☐ New Jersey

<http://codes.findlaw.com/nj/title-39-motor-vehicles-and-traffic-regulation/nj-st-sect-39-4-54.html>

☐ New Mexico

<https://law.justia.com/codes/new-mexico/2016/chapter-66/article-7/part-5/section-66-7-408/>

☐ New York

[https://govt.westlaw.com/nycrr/Document/I504e17f2cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/I504e17f2cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default))

☐ North Carolina

<http://codes.findlaw.com/nc/chapter-20-motor-vehicles/nc-gen-st-sect-20-123.html>

☐ North Dakota

<http://www.legis.nd.gov/cencode/t39c21.pdf>

☐ Ohio

<http://codes.ohio.gov/orc/4513.32>

☐ Oklahoma

<https://law.justia.com/codes/oklahoma/2014/title-47/section-47-12-405.1/>

☐ Oregon

<https://law.justia.com/codes/oregon/2015/volume-17/chapter-818/section-818.150>

State by State List Courtesy of Piet Barber - Please Advise Corrections

Trailing Regulations Per Each US State

☐ South Dakota

http://www.sdlegislature.gov/Statutes/Codified_Laws/DisplayStatute.aspx?Type=Statute&Statute=32-19

☐ Tennessee

<https://law.justia.com/codes/tennessee/2010/title-55/chapter-7/part-1/55-7-114/>

☐ Texas

<http://www.statutes.legis.state.tx.us/Docs/TN/htm/TN.545.htm>

http://txrules.elaws.us/rule/title37_chapter21_sec.21.5

☐ Utah

<https://le.utah.gov/xcode/Title41/Chapter6A/41-6a-S1634.html>

☐ Vermont

<https://law.justia.com/codes/vermont/2016/title-23/chapter-13/section-1341/>

☐ Virginia

<https://law.lis.virginia.gov/vacode/title46.2/chapter10/section46.2-1118/>

☐ Washington

<https://app.leg.wa.gov/wac/default.aspx?cite=204-70-070>

☐ West Virginia

<http://www.wvlegislature.gov/WVCODE/ChapterEntire.cfm?chap=17c&art=17>

☐ Wisconsin

<https://docs.legis.wisconsin.gov/statutes/statutes/347/III/47>

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Trailing Regulations Per Each US State

☐ Pennsylvania

<http://codes.findlaw.com/pa/title-75-pacsa-vehicles/pa-csa-sect-75-4905.html>

☐ Rhode Island

<https://law.justia.com/codes/rhode-island/2012/title-31/chapter-31-25/>

☐ South Carolina

<https://www.lawserver.com/law/state/south-carolina/sc-code/south carolina code 56-5-5150>

☐ Wyoming

<https://law.justia.com/codes/wyoming/2016/title-31/>

☐ District of Columbia

<https://code.dccouncil.us/dc/council/code/titles/50>

State by State List Courtesy of Piet Barber - Please Advise Corrections

Internet Resources

☐ Videos

- <https://www.youtube.com/watch?v=QMeqZFDFCaI>
- <https://www.youtube.com/watch?v=iCDt4tjxp-E>

☐ Safety

- <https://pacifictrailers.com/blogs/boat-trailer-tips-advice/safety-chains-vs-safety-cables>

☐ Trailer Hardware Sources

- <https://www.etrailer.com/>

☐ Trailer Engineering Details

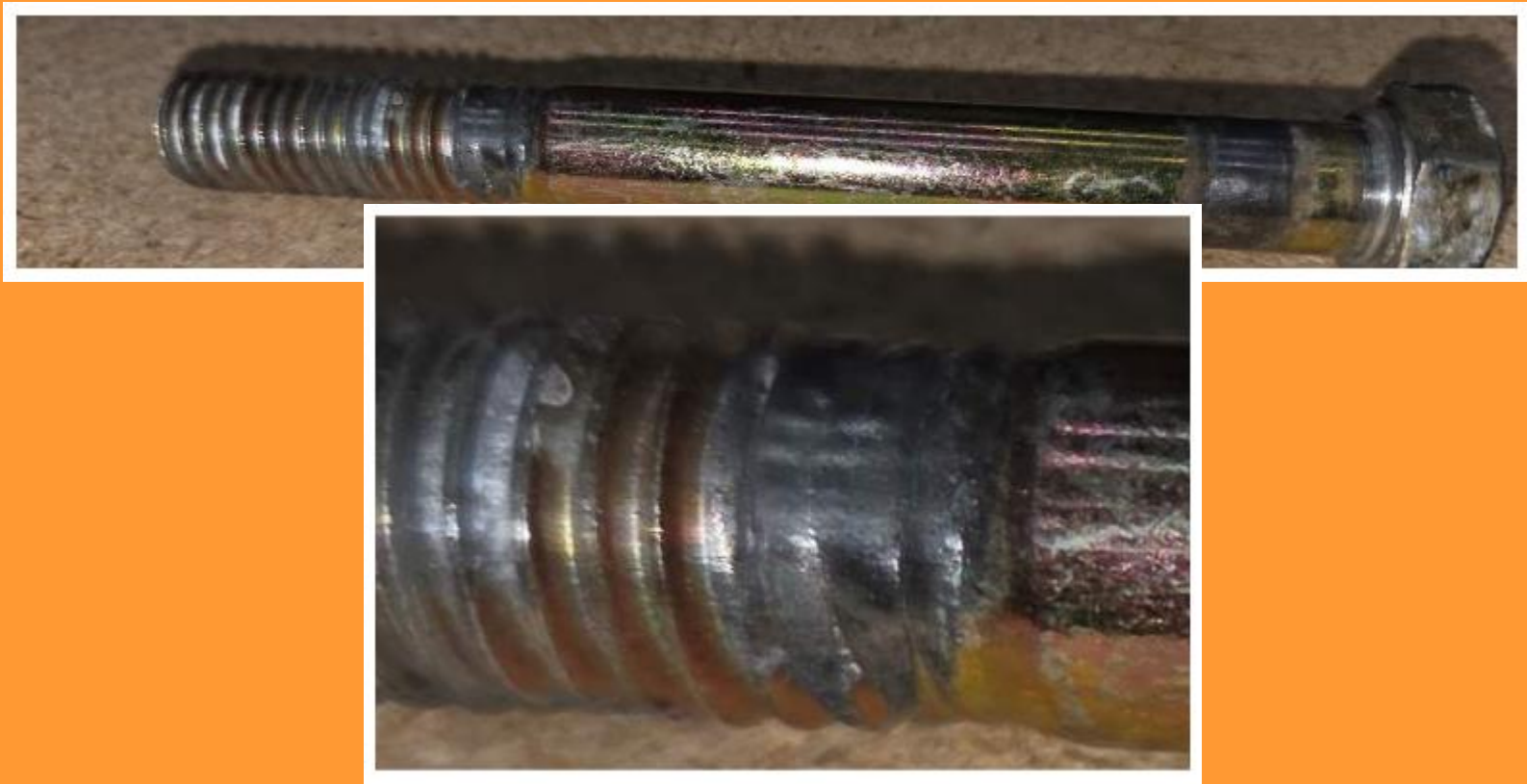
- <http://aviation.derosaweb.net/presentations/documents/Trailer-Engineering-Guide-for-Safety-Chain-Installation.pdf>

☐ Other

- **Wiring -**
<https://aviation.derosaweb.net/presentations/#trailerwiring>
- **Ramps -**
<https://aviation.derosaweb.net/presentations/#trailerramps>
- **Manuals -** <http://aviation.derosaweb.net/trailer/>

Critical Hint #7

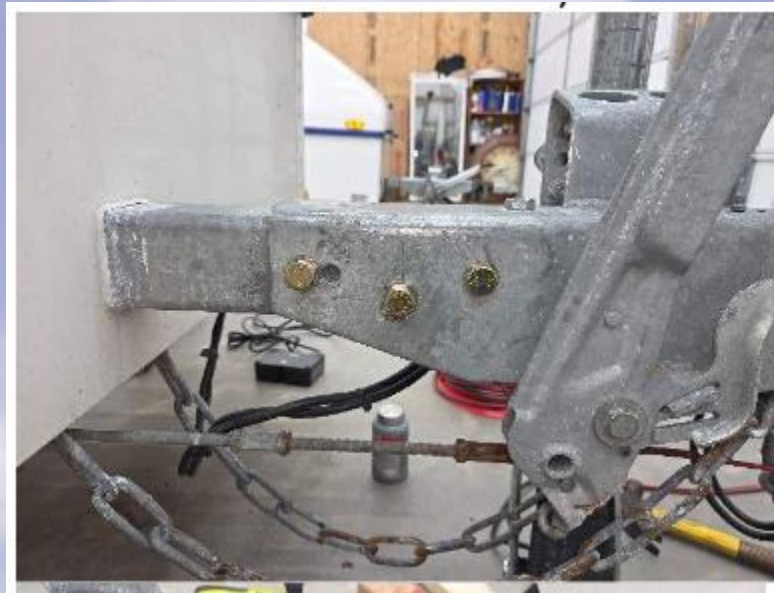
Cobra Trailers Tongue Bolt Failures



Cobra Trailers Square Tongue Bolt Fix

The main bolts holding the tongue of Cobra trailers are known to wear to the point of failure.

The bolts should be removed, inspected, and probably should be replaced. Installing a new fourth bolt vertically is recommended.



See Details at: <https://groups.google.com/g/rasprime/c/f-IY7YzvhTM>

Trailer Wiring

For details See ...

<https://aviation.derosaweb.net/presentations/#trailerwiring>

Trailer Wiring & LED Conversion For Glider Pilots



Trailer Ramps

For details See ...

<https://aviation.derosaweb.net/presentations/#trailerramps>



Remember...

“Chains are Only as Strong as the Weakest Link”



Other Presentations

- Glider Electrical Wiring
- Transceiver Troubleshooting
- Oxygen Systems
- Working with Glider Air Lines
- Trailer Wiring & LED Lighting
- Trailer Towing & Chains
- Soaring Pilot Relief Systems
- Battery Testing
- Emergency Location Devices
- Survival Kits
- Bailing Out Successfully
- Spar Alignment Tool
- L'Hotellier Fittings
- Carbon Fiber Panels
- IGC Filename Decoding
- Blanik L-23 Strut Work
- Removing Painted Lettering
- Open Glider Network
- Instrument Knob Extensions
- Landing Gear Warning

<http://aviation.derosaweb.net/presentations>

Let me know of any comments!