

YOUR BOAT TRAILER

A presentation on the TRAILER part of Trailer Sailors



1. Trailer Theory

1. Weights & Measures

2. Hitches

1. Ratings

3. Structural Integrity

1. Bolts, welds, bunks & rollers
2. Rust?

4. Wheels

1. Tires, wheels, lug nuts & a spare
2. Bearings and seals

5. Brakes

1. Drums, discs, brake lines and Brake Fluid
2. Surge Brakes and how to test them

6. Electrical

1. Connections

7. Tool Kit

1. For repairs on the road

8. Bunks

1. Carpet or plastic covers

9. Salt Water Concerns

10. Trailer Resources

SO WHAT DO YOU REALLY NEED ?

1. A Tow vehicle with a large enough GCWR and Hitch/Tongue weight capacity
2. A Trailer Hitch rated for the load
3. A Trailer in good working condition.
4. A Trailer that is not overloaded with your boat and gear.
5. Securing your boat on the trailer
6. Some knowledge of how to drive when pulling a trailer.
7. A Safety Kit

1. A Tow vehicle with a large enough GCWR and Hitch/Tongue weight capacity

What the heck is GCWR and Hitch/Tongue Weight Capacity? My vehicle has a maximum towing capacity that is greater than the weight of my boat trailer, do I need to be concerned? YES

Hitch/Tongue Weight



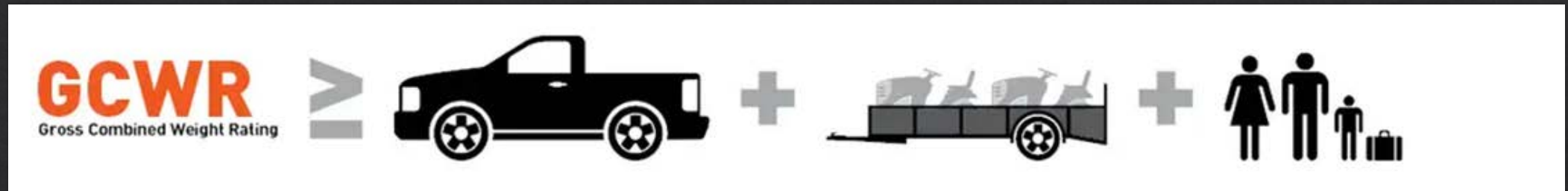
Tongue Weight Capacity is easy. Somewhere in your manual or online you will find the maximum weight you can put on your trailer hitch.

If you exceed this amount the downward weight on the hitch will lift your front tires off the road and you won't be able to steer.

It can get a little complicated if you add some passengers in the back seat or gear in the trunk

Recommended TW is 10% of Trailer Weight – You need 350 – 450 lb

GCWR – Gross Combined Weight Rating



The GCWR is the TOTAL of Curb Weight of the EMPTY vehicle + the Payload + Gross Trailer Weight

Vehicle manufacturers don't advertise GCWR but it can be found in manuals and online.

They advertise **Maximum Towing Capacity** – Which is the Gross Trailer Weight you can tow ONLY IF the payload is 0.

Any payload you add DECREASES the Maximum Towing Capacity.

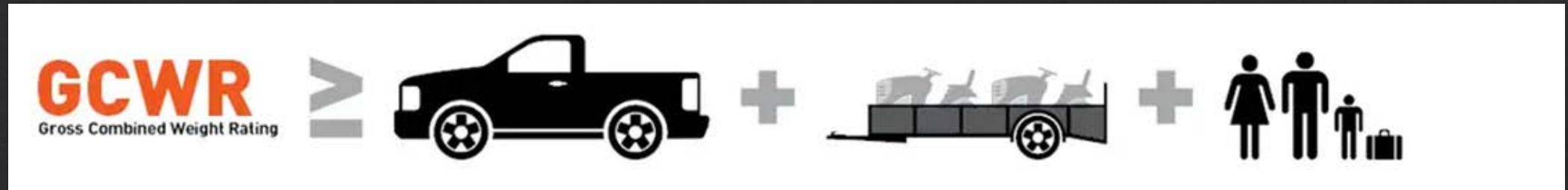
$$\text{GCWR} = \text{CURB WEIGHT} + \text{PAYLOAD} + \text{GROSS TRAILER WEIGHT}$$

The equation is displayed with a large orange arrow pointing upwards from the word 'PAYLOAD' and a large orange arrow pointing downwards from the word 'TRAILER'.

YOUR 2018 HYUNDAI SANTE FE HAS AN ADVERTISED **TOWING CAPACITY** OF **5500 LB**

| Item | | Engine | |
|--|----------------------|-------------------------|--------------------|
| | | Gasoline Engine | |
| | | 3.3 GDI | |
| Maximum trailer weight lbs. (kg) | Without brake System | | 1653 lbs (750 kg) |
| | With brake System | Without trailer package | 2000 lbs (907 kg) |
| | | With trailer package | 5000 lbs (2267 kg) |
| Maximum permissible static vertical load on the coupling device lbs. (kg) | | | 500 lbs (226 kg) |

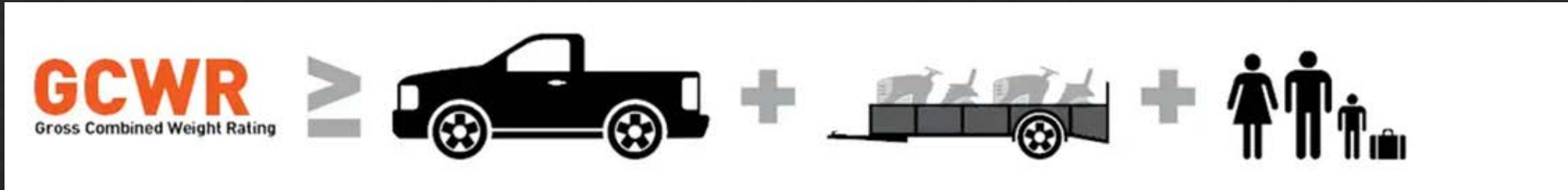
HOW MUCH CAN YOU REALLY TOW?



Example 2017 Hyundai Sante Fe (with towing package)

| GVWR | Curb Weight (Doesn't change) | Payload (Changes) | Max Towing Capacity (Gross Trailer Weight) – (Changes) | GCWR (Estimated) |
|------|------------------------------|-------------------|--|---------------------|
| 5500 | 4200 | 0 | 5000 (w/brakes) | 4200 + 5000 9200 |
| | 4200 | 200 | 4200 | 8600 |

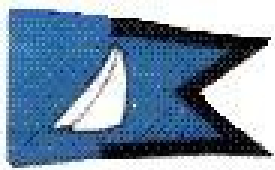
SO WHAT SHOULD YOU DO?



Look up or calculate/estimate your GCWR

The next time you are towing, go to a truck scale and measure the weight of tow vehicle and contents that you normally travel with and the weight of your trailer loaded normally for travel.

Make the calculation: Vehicle Weight + trailer weight and hope it is less than your GCWR



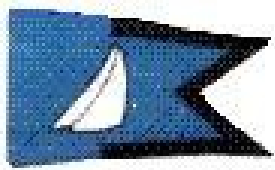
WEIGH YOUR BOAT & TRAILER

Step 1 – Find a Truck Scale

Step 2 – Weigh just the tow vehicle (unhitched) Front axle only on scale then both axles on scale, then back axle only on scale. Front + Back = both on scale

Step 3 – Hitch trailer then weigh Front axle on scale, then rear axle on scale, then just trailer axle on scale

Step 4 – Head home to do your calculations



WEIGH YOUR BOAT & TRAILER

| Weight of: | |
|--|---|
| Just Tow Vehicle Front axle | A |
| Just Tow Vehicle Rear axle | B |
| Vehicle and trailer hitched Vehicle Front Axle | C |
| Vehicle and trailer hitched Vehicle Rear Axle | D |
| Vehicle and trailer hitched trailer Axle(s) | E |

| VALUES | Calculation |
|---|----------------------------------|
| Curb Weight + Payload (Vehicle) | $A + B$ |
| Tongue Weight (at least 10% of Trailer) | $(C + D) - (A + B)$ |
| GROSS COMBINED WEIGHT | $C + D + E$ |
| TRAILER WEIGHT | $(C + D + E) - (A + B)$ |
| Still got steering & front wheel traction ? | $A - C$ (the smaller the better) |
| GROSS AXLE WEIGHT | Compare C,D & E to their GAWR's |

2. TRAILER HITCH RATINGS

Trailer Hitch Receivers - Class III Rated up to 6,000 lbs GTW with 600 lbs TW

Designed for trucks, vans and sport utility vehicles

2" x 2" receiver hitch opening (Class II have 1-1/4" openings rated at 3500 lbs)

NOTE: Most manufacturers call any hitch with a 2" x 2" opening a Class III hitch. It is not uncommon to see a 2" hitch rated at 3,500 lbs GTW called a Class III hitch.

Hitch & Ball

Both have ratings – need minimum GVWR 6000 lb Tongue Wt. 600 lb

Will work with hitch balls with a 1 " diameter shank



3. A Trailer in good working condition.

- ◆ Structural Integrity
- ◆ Wheels, Bearings & Tires
- ◆ Brakes
- ◆ Electrical

Structural Integrity

- ◇ Start at the front of trailer and work to back checking condition of:
- ◇ Hitch & Brake actuator



Structural Integrity

- ◆ Tongue – Bolts, Welds and Rust
- ◆ The outside of the tongue may look fine but they usually rust from the inside out.
- ◆ Use a hammer and listen for “solid” metal sounds.



Structural Integrity

- ◆ Front post, Trailer winch and strap
- ◆ Look for rust and secure bolts on the winch.
- ◆ Make sure the strap does not have worn or frayed sections.



Structural Integrity

- ◆ Bow keel support – Bolts and Rust
- ◆ Bunks – Rot, Rusted Bolts, Metal Supports and Bunk carpet



Structural Integrity

- ◆ Trailer Frame – Bolts and Rust – the aluminum might not rust but the bolts that hold it together can come loose.
- ◆ Trailer Guides – Bolts and Rust



RUST TELL TALES

- Colour – is obvious
- Bubbles under the paint
- Metal peeling and flaking
- Sound – USE A HAMMER – sound is the only way of identifying rust inside metal tubing. Learn the difference between “solid” metal sounds and rusted metal sounds.



WHEELS, TIRES, and BEARINGS

- ◇ Wheels – Look for Rust on the wheel and the lug nuts
 - ◇ Rust weakens the wheel but more likely makes it impossible to remove the wheel lug nuts if you have to change a flat.
- ◇ Tires – Likely going to be “OLD” rather than “BARE”
 - ◇ Recommended lifespan of a tire is maximum 7 years – they may still look new!
 - ◇ Check “PRESSURE” frequently. Should be kept at MAXIMUM RATED PRESSURE.



WHEELS, TIRES, and BEARINGS

- ◇ Bearings – Check for Grease
 - ◇ It is unlikely that your bearings will be bad unless you have run them for a lot of miles with no grease
 - ◇ Overheating will be indicated by grease sprayed all over the wheel.



BRAKES

Surge Brake Actuator



Master
Cylinder

Brake lock-out
– insert a bolt
to prevent
sliding.

Hitch



Master Cylinder

BRAKES

Disc brakes are easier to maintain and inspect than drum brakes.

Be sure to let your brakes cool before you submerge them at the ramp. The rapid change in temperature will cause them to become unglued or cracked.



CHECKING BRAKE COMPONENTS

1. Disk or Drum Brakes

1. Check pads or shoes to make sure they can actuate – not rusted in place
2. Raise the wheel and see if it turns freely

2. Brake lines and Fluid

1. Look for kinks and leaks in the brake lines
2. Check fluid level in master cylinder

3. Surge Brake Controller

1. Check to see cylinder released – has hitch section slid forward when pressure released?
2. Disconnect electrical lock out (unplug trailer from vehicle) back the trailer up a slight hill. The brakes should come on as the actuator is compressed.



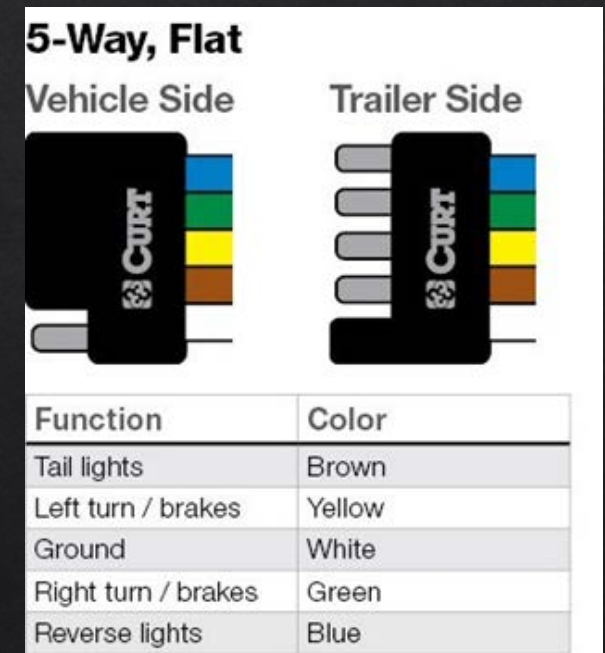
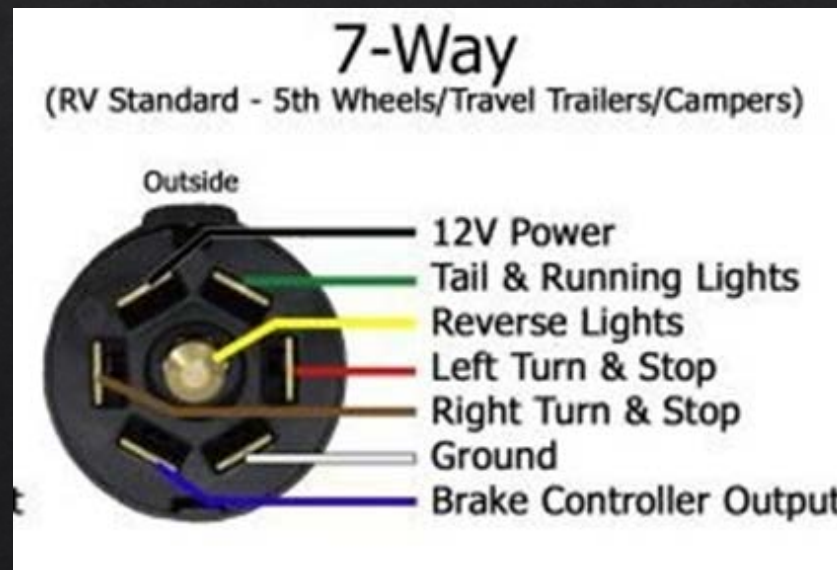
ELECTRICAL - It's all about connections

Electrolysis – chemical reactions when you have metals in water.

1. Copper wire touching aluminum or steel in salt water creates a reaction that destroys electrical connections – **USE WATER PROOF CONNECTIONS**
2. Electric current (trailer plugged in) creates chemical reaction in salt water that destroys connections. **UNPLUG LIGHTS BEFORE SUBMERGING TRAILER**
3. It is often the ground connections that are affected

Corrosion – Oxidation/Rust blocks electrical connections

Trailer connectors



4. A TRAILER THAT IS NOT OVERLOADED

| | 26X Model trailer & Boat | 26M Model trailer & Boat |
|---|--------------------------|--------------------------|
| GVWR (Maximum weight of trailer and boat) | 3800 lb | 4200 lb |
| Weight of Trailer | 710 lb | 530 lb |
| Weight of boat from dealer | 2250 lb * | 2920 lb (BWY) |
| Owner installed gear | Max 840 lb | Max 750 lb |

* guesstimated

How much does “STUFF” Weigh ?

| | |
|--|------------|
| Trailer guide on bars | 20 |
| Anchor & spare anchor | 50 |
| Solar Panel, Controller, switches and mounts | 100 |
| Built in Storage Drawers and Cupboards | 50 |
| Fridge/Freezer | 50 |
| Cooler & Ice packs | 15 |
| Fuel (24 gal) @ 6 lb/gal | 145 |
| Water (10 gal) @ 8 lb/gal | 80 |
| Galley equipment | 70 |
| Dinghy & outboard | 120 |
| Wine (2 @ 5L boxes) | 22 |
| Beer (24 @ >.375 L | 20 |
| Total | 742 |

IS YOUR TRAILER OVERWEIGHT ?

- ◇ I know mine is and that is why I upgraded to a larger axle and wheels with a 6500 lb rating.
- ◇ Are You? – Maybe, the only way to know is to visit those truck scales and see the numbers for yourself.

What's the Problem with OVERWEIGHT ?

1. **Hard to Control**

1. Hard to stop
2. Sway

2. **Brake Failure** – Overheating

3. **Tire Blowout**

4. **Damage to Other Parts**

1. Suspension
2. Transmission
3. Engine



5. SECURING YOUR BOAT ON THE TRAILER

- ◆ Trailer Winch and Strap
 - ◆ The strap holds the boat in tight to the “V” in order to keep the weight of the boat balanced on the trailer.
 - ◆ Make sure the winch is locked and can’t spring loose.
- ◆ Safety Chain
 - ◆ In case the strap breaks



SECURING YOUR BOAT ON THE TRAILER

◇ Position of boat on trailer

◇ The bow needs to be as far forward as possible to balance the weight of the boat on the trailer. If the boat is sitting back from the bow “V”, weight will be too far back and the boat and trailer will rock backward lifting the hitch off the towing ball.

◇ The MacBump - Used when necessary to slide the boat as far forward on the trailer as possible.

◇ Belly Strap

◇ The boat is secured by a belly strap that holds it down onto the trailer.



6. DRIVING TIPS FOR SAFE TOWING

- ◆ Towing a trailer is an unfamiliar activity for most of us.
- ◆ It seems like the driving we normally do. The steering wheel and brakes are still in the same place but they react **DIFFERENTLY**
- ◆ We need to think about those differences and be **AWARE.**

DRIVING TIPS FOR SAFE TOWING

◆ Before you even connect your trailer

◆ Check Trailer Tires

◆ Wear (seldom a concern) and PRESSURE – Our trailer tires should be at max pressure

◆ Match Tow Hitch and Ball

◆ Size and Rating – most decoupling accidents involved mismatched sizes

◆ Have a “Trailer” Spare Tire

◆ And the Equipment to change it

◆ Jack, wheel blocks, tire iron – that fits!

DRIVING TIPS FOR SAFE TOWING

◆CONNECTING YOUR TRAILER

- ◆ Hitching your trailer – Secure and lock the hitch lever
- ◆ Safety Chains – Looped under the hitch and attached to vehicle – to keep the hitch from digging into the ground.
- ◆ Safety Brake – Breakaway cable attached to the vehicle to activate brakes if trailer disengages
- ◆ Trailer Lights – All working before you drive away

DRIVING TIPS FOR SAFE TOWING

◆ ON THE ROAD

- ◆ Time & Distance – Affects Stopping, Steering, accelerating – ALL MOVEMENT
- ◆ Turning - Wider turns at Curves and Corners – trailer wheels do not follow vehicle wheels
- ◆ Backing – Use a observer outside the vehicle – PRACTICE !
- ◆ Downhill Braking – apply brakes in intervals to reduce overheating, Gear down
- ◆ Launching - Cool brakes & Disconnect wiring
- ◆ Check your route ahead of time – Don't get stuck in a Dead End
- ◆ Practice Driving with a Trailer – EXPERIENCE IS THE BEST TEACHER

7. TOOL KIT (for the road)

1. GENERAL

1. Air pressure gauge/ Air pump
2. Grease Gun, Brake fluid
3. Spares
 1. light bulb
 2. electrical wire
 3. electrical tape
 4. Connectors
 5. Rescue tape

TOOL KIT (2)

REMOVING A WHEEL

1. Jack to lift trailer (minimum 4000 lb capacity)
2. Blocks for wheels (2x4) and jack
3. Penetrating Oil – dissolves rust
4. Wrench for lug nuts – BIG breaker bar

DISMANTLING BRAKES

1. Wrenches to remove and replace bolts
2. Bailing wire – hang brake assembly or ??????
3. Large flat screw driver to pry
4. Brake adjusting tools – for drums

TOOL KIT (3)

WHO KNEW IT WOULD BE HANDY?

1. Hammer
2. Duct tape & zap straps
3. Wood blocks
4. Carpet or tarp to lie on
5. Propane torch
6. Rags/roll of shop towels
7. Hand cleaner

TRAILER SAFE



SAIL SAFE AND LEAVE ONLY WAKE