



How To Build Your Own Bed

2

Design Considerations

- o Load Balance
- Features
- Structure

Fabrication

- Ready Made Components One-Off Components
- Lessons Learned
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 - Henry Szymt







Most of the time, we are solving for one of the forces.

So, if we are solving for f_1 , $f_1 = (f_2 * d_2) / d_1$



 $GVW_{Trailer} = Pin + Trailer Axle$ Pin is weight is transferred to the Front Axle and Rear Axle







$$\begin{split} f_{Drom} &= (Drom \ Weight \ *(Wheelbase - DromSB)) \ / \ Wheelbase \\ f_{Bed} &= (Bed \ Weight \ * (Wheelbase - BedSB)) \ / \ Wheelbase \\ f_{Hitch} &= (Hitch \ Weight \ * (HitchSB - Wheelbase)) \ / \ Wheelbase \\ FAW_{Toter} &= UFAW + f_{Drom} + f_{Bed} - f_{Hitch} \end{split}$$



 $f_{Bed} = (2500 * 70) / 200 = 875$ $f_{Bike} = (1200 * 100) / 200 = 600$ $f_{Hitch} = (600 * 50) / 200 = 150$

 $f_{Bed} = (2500 * 130) / 200 = 1625$ $f_{Bike} = (1200 * 100) / 200 = 600$ $f_{Hitch} = (600 * 250) / 200 = 750$

RAW = 7100 + 1625 + 600 + 750 = 10075FAW = 9750 + 875 + 600 - 150 = 11075



 $f_{Bed} = (1800 * 80) / 240 = 600$ $f_{Drom} = (3200 * 120) / 240 = 1600$ $f_{Hitch} = (540 * 60 / 240 = 135)$ $f_{Bumper} = (2880 * 90) / 240 = 1080$ $f_{Bed} = (1800 * 160) / 240 = 1200$ $f_{Drom} = (3200 * 120) / 240 = 1600$ $f_{Hitch} = (540 * 300) / 240 = 675$ $f_{Bumper} = (2880 * 330) / 240 = 3960$

RAW = 7100 + 1200 + 1600 + 675 = 10575FAW = 10250 + 600 + 1600 - 135 = 12315

RAW = 7100 + 1200 + 1600 + 675 + 3960 = 14535FAW = 10250 + 600 + 1600 - 135 - 1080 = 11235







Design Considerations

15



What Features Do You Want?

16

• Bed

- Carry Stuff?
- Add Weight?

• Drom Box

- Tool Storage?
 Satellite Dish Storage?
 BC Helicenters?
- RC Helicopters?
- Support for 5th Wheel
- Standalone Motorhome

Storage Boxes

- Special Items Cookery
- Concert Organ with Footboard
- MIG Welder w/ Tank
- Smart Car Loader
- Extended Boondocking
- Hitch
 - ET, ET TSR
 - TrailerSaver
 - BRP Head?



Major Design Considerations

• What wheelbase do you need?

- Single or Dual?
- If single, front, rear, some other?

• Where do you place the hitch

• What total length can you live with?

Secondary Design Considerations

18

Mounting Techniques

- o Direct Bolt On
- Brackets
- Isolation Bushings

Miscellaneous

- Access to Fuel Fillers
- Departure Angle Clearance
- Rear Flat Tire
- Cab Shocks and Air Bags
- o DOT Lights and Reflectors

Secondary Design Considerations

19

• One Piece

- o Installation and Removal requires heavy equipment
- Minimizes storage box panels
- Access to mounting points is difficult
- Access to repair items is more difficult, adds \$\$\$ to repair

• Modular

- Allows for manual installation of parts.
- More labor during fabrication.
- Flexible structure
- Removal of parts for repairs possible
- More difficult final assembly



$$\begin{split} f_{Trans} &= (2500^*(196\text{-}36))/196 = 2041 \\ f_{Cab} &= (3000^*(196\text{-}80))/196 = 1776 \\ f_{Storage} &= (400^*(196\text{-}104))/196 = 188 \\ f_{Fuel} &= (1800^*(196\text{-}126))/196 = 643 \end{split}$$

$$\begin{split} f_{Trans} &= (2500^*(252\text{-}36))/252 = 2143 \\ f_{Cab} &= (3000^*(252\text{-}80))/252 = 2048 \\ f_{Storage} &= (400^*(252\text{-}104))/252 = 235 \\ f_{Fuel} &= (1800^*(252\text{-}126))/252 = 900 \end{split}$$

Singling to the rear position transfers weight from the rear axle to the front axle. In our example above: 678 lbs.



Design Considerations - Hitch

21

• Hitch (Applies to All Mfg)

- Must be directly mounted to the truck frame.
- Hitch Height needs to match trailer.
- Usually needs to be mounted below the top flange of the frame.

Mounting Plate

- Must be 1/2" full plate OR two pieces of 6" wide, 3/4" plate.
 - × Source TrailerSaver mounting instructions
- No drilling in frame flanges, only in the frame web.
- No welding on frame in front of rearmost suspension mount point.



Hitch Placement

• Hitch placement affects:

- Loaded axle weight
- Turning Capability
 - × Jack Knife
 - Campground backing
 - × Urban maneuverability
- Deck Utilization



• Hitch placement may require structural truck work

- Air bag valve actuator arm
- Frame cross members









As the trailer and truck move off-angle, the cap of the trailer moves towards the truck as specified by Sin 10° * Height of Protuberance. 5° is trucking standard minimum. 10° covers just about every campground.



Usable deck space is the area tangent to the Arc at it's midpoint.



DOT and Your Bed

29

Do you need a DOT sticker ?

NO, But ...

What do they actually care about ?

Safety Equipment

