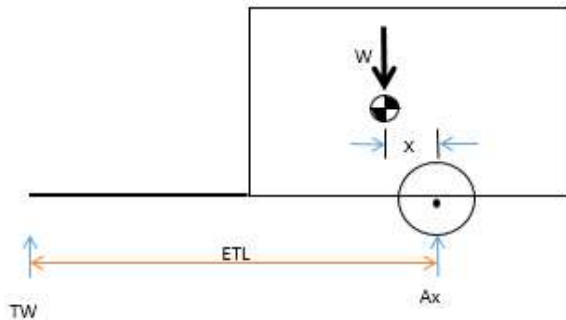


MEASURING TRAILER TONGUE WEIGHT

Intro: 3 options/Conditions for measuring tongue weight

1. Single Axle – Trailer intact
2. Multiple Axle – Trailer intact
3. Single or Multiple Axle – Trailer tongue or suspension damaged

Single axle – Intact



TW (ETL) = W(x)

TW: tongue weight (lb)

ETL: effective tongue length (in) – center of wheel to center of coupler

W: total trailer weight, including tongue weight (lb)

X: dist. from center of gravity to center of wheel (in)

Procedure:

1. Use scale directly under coupler “ball socket,”
2. Level trailer
3. Measure TW directly

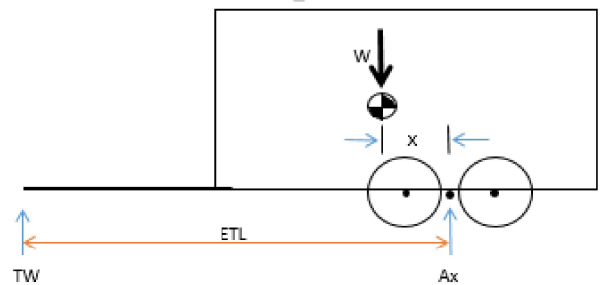
Measure W directly on platform scale where the entire trailer and tongue weight is measured, or by measuring TW and Ax and adding.

TW = weight measured directly from scale (#3 above)

$W = TW + Ax$

$$\text{Tongue Weight} = \frac{TW}{W} \times 100$$

Tandem – Intact



TW (ETL) = W(x)

TW: tongue weight (lb)

ETL: effective tongue length (in) – center of suspension to center of coupler

W: total trailer weight, including tongue weight (lb)

X: dist. from center of gravity to center of suspension (in)

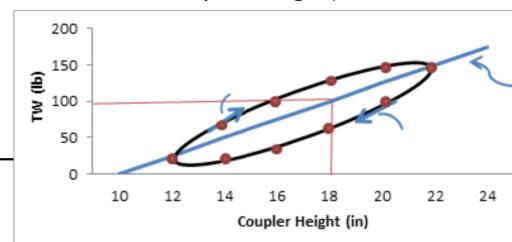
Procedure:

1. Use scale, placed on floor jack, directly under coupler “ball socket.”
2. Use tape measure and adjust “ball socket” height to 12 inches.
3. Use floor jack to raise then lower coupler to specific height increments and record TW at each height.
4. Use chart below to complete in sequence of chart.

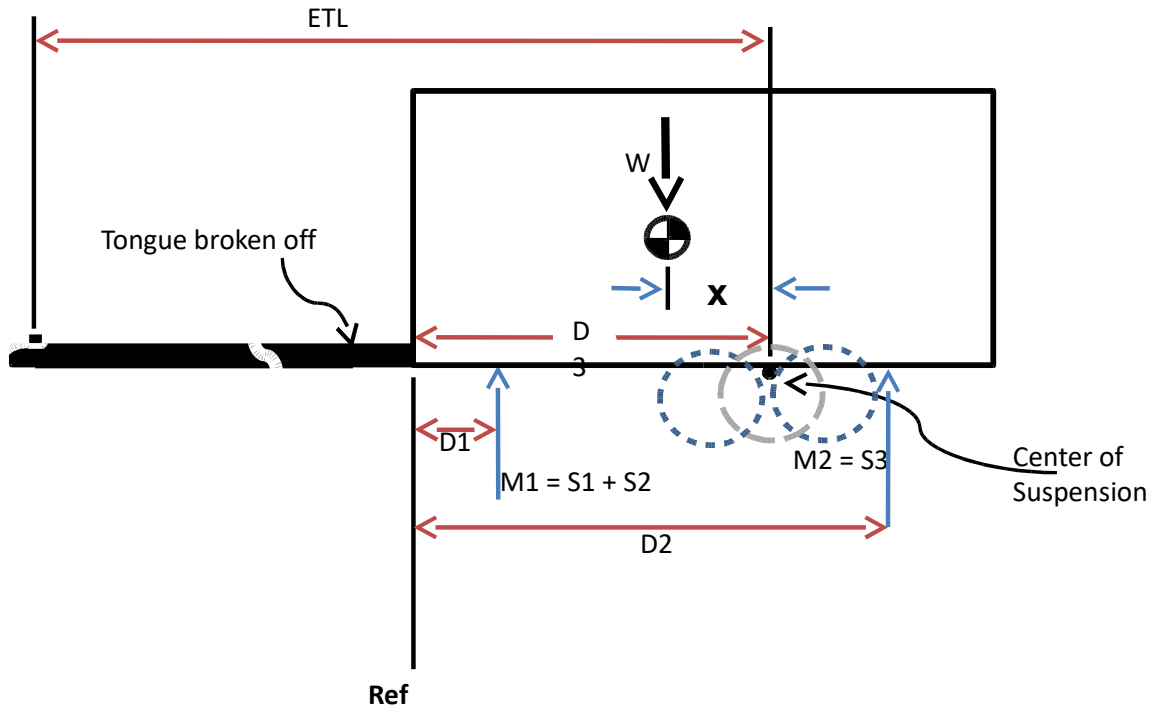
Height (in)	12	14	16	18	20	22	20	18	16	14	12
TW (lb)											

TW Determination:

1. Average the (2) measurements taken when trailer was level (ex. 18”) or
2. Determine case specific coupler height by measuring ball height on tow vehicle, then use graph to select TW for the specific height. (Ex. Below =y 100 pounds TW for an 18 inch ball/coupler height).



Trailer Tongue or Suspension Damaged



D_1, D_2, D_3 : Distance measures
Ref: Reference location for distance $D_1, D_2,$ and D_3 measures
 M_1 : Support weight at front ($M_1 = S_1 + S_2$)
 M_2 : Support weight at rear
 S_1, S_2, S_3 : Measured scale weights at respective positions
ETL: effective tongue length (in) – center of coupler to center of suspension (tandem) or wheel (single axle)

Procedure:

1. Effective Tongue Length will be needed. Measure individual components and add them together or get specification from manufacturer.
2. Use 3 Platform scales (small portable type) with a jack stand on top of each scale.
3. Tare (calibrate/zero) each scale to read zero with the jack stand on scale.
4. Place jack stands/scales under trailer to support entire weight of trailer, with S_1 and S_2 placed at position M_1 , and S_3 placed at position M_2 . S_1 and S_2 should be spaced apart about 4 feet, approximately 2 feet left and right of the trailer centerline, and both distance D_1 rearward from the Ref location. S_3 is placed near the trailer centerline and distance D_2 rearward of Ref.
5. Measure and record $S_1, S_2, S_3, D_1, D_2,$ and D_3 .

Calculations:

$$M_1 = S_1 + S_2$$

$$M_2 = S_3$$

$$W = S_1 + S_2 + S_3 = M_1 + M_2$$

$$M_1(D_1) + M_2(D_2) = W(D_3 - x)$$

Solve for x :

$$M_1(D_1) + M_2(D_2) = W(D_3) - W(x)$$

$$x = \frac{W(D_3) - M_1(D_1) - M_2(D_2)}{W}$$

Tongue Weight:

$$TW(ETL) = W(x)$$

$$TW = \frac{W(x)}{ETL}$$

Tongue Weight Percentage:

$$Tongue\ Weight = \frac{TW}{W} \times 100$$