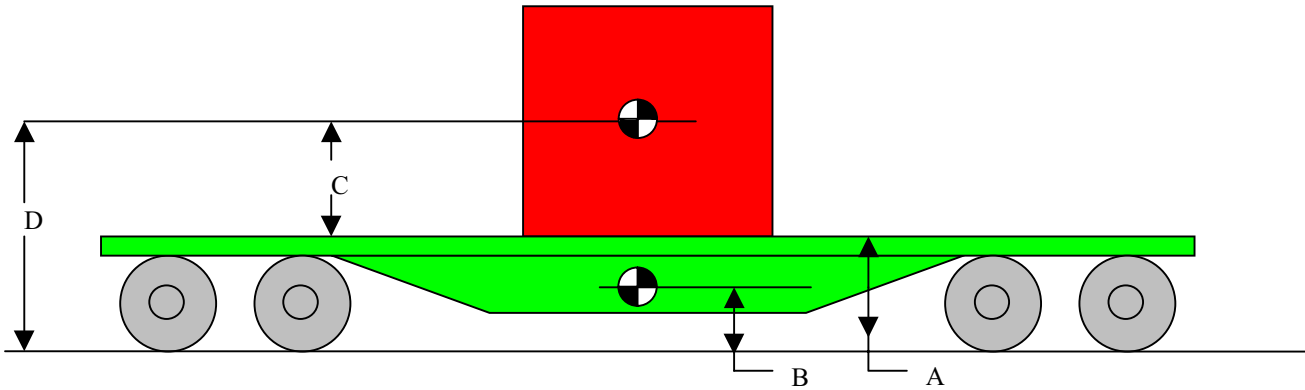


Load and Ride Solutions Loading Assistance

CENTER OF GRAVITY - RAILCAR MOVEMENTS

PROCEDURES FOR DETERMINING COMBINED CENTER OF GRAVITY OF LOAD ON CAR ABOVE TOP OF RAIL OF LOADED OPEN TOP CARS AND BOXCARS.



The following information is necessary to determine the combined center of gravity of a loaded railcar.

- A = Height of car deck in inches from top of rail. (Stenciled on railcar - only source.)
- B = Center of gravity of empty railcar above top of rail in inches. (Stenciled on railcar - only source.)
- C = Center of gravity of load from base of load in inches. (Shipper furnishes.)
- D = Combined height of center of gravity of load, (C), plus height of car deck, (A), that is (C) + (A).
- E = Light or tare weight of railcar, in pounds. (Stenciled on railcar and in Umler.)
- F = Weight of load in pounds. (Shipper furnishes.)

The calculation to arrive at the center of gravity is as follows:

$$\frac{(B \times E) + (D \times F)}{E + F} = \text{C.G. ATR}$$

- Example:
- A = 44 inches
 - B = 27 inches
 - C = 60 inches
 - D = (60 + 44) = 104 inches
 - E = 55,000 Lbs.
 - F = 120,000 Lbs.

Formula: $\frac{(B \times E + (104 \times 120,000))}{E + F}$

$$\frac{(27 \times 55,000) + (104 \times 120,000)}{55,000 + 120,000}$$

$$\frac{1,485,000 + 12,480,000}{175,000} = \frac{13,965,000}{175,000} = 79.8 \text{ inches ATR}$$

- Notes:
1. The above is an example of a basic calculation for determining the combined center of gravity of load and car.
 2. Where the load consists of multiple piles or pieces with differing centers of gravity, the entire C.G. of the entire load must be calculated before it is combined with car weight & C.G.
 3. Acceptable centers of gravity for interchange purposes are governed by Rule 89, Section B, 1, e of the AAR Interchange Rules.