

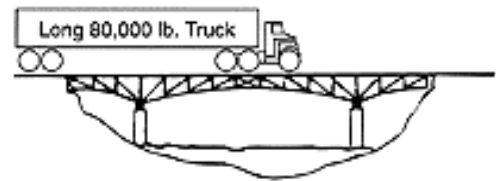
Truck Scale Deflection - what does it mean and is it important?

de·flec·tion *n.* (di-'flek-sh&n)

1. The movement of a structure or structural part as a result of stress.
2. The bending which a beam or girder undergoes from its own weight or by reason of a load.

(Source: American Heritage® Dictionary and Webster's Revised Unabridged Dictionary)

Deflection is usually stated as a ratio in the form of 1:xxx or 1/xxx. The typical method of computing a ratio is to divide the mid-span deflection at rated CLC by the longitudinal span between supports, but the **U.S. scale industry has no standards regarding deflection ratios.**



Scale Deflection Facts

All scales, regardless of design, capacity rating, or who manufactures them, deflect when a load is applied. The larger the load, the greater the deflection. When speaking of truck scales, deflection occurs not only in the weighbridge, but also in the weight sensors and suspension parts. The most deflection typically occurs when load is concentrated halfway across the weighbridge span. Normal deflection does not affect performance or longevity of a well-designed scale system.

Span deflection ratios are not recognized as a truck scale rating by the National Conference on Weights and Measures (NCWM), the National Institute of Standards and Technology (NIST), or the Scale Manufacturer's Association (SMA).

Real World Meaning

Once again, all scales deflect when a load is applied. The important consideration is not how much the weighbridge deflects, but rather how load stresses are handled throughout the entire scale structure. **When loaded to capacity, a well-engineered and tested truck scale design will experience structural stresses that are safely below fatigue limits.**

Contrary to claims that less deflection means longer weighbridge life, careful engineering analysis proves that a ratio of (1/900) for one design may actually be deficient compared to a ratio of (1/800) for another design. Fatigue stresses that damage a scale over time have little to do with measurable span deflection of the weighbridge.

The real key to a long truck scale life is designing and building the entire system in such a way that it does not experience fatigue stress levels at capacity rating. That is exactly what Avery Weigh-Tronix has been doing for over 30 years as proven by long-lasting performance at thousands of installations worldwide that are reinforced with the longest weighbridge warranties.

Competitive Hype



The less a scale deflects, the better it performs and the longer it lasts? ~ Span deflection ratios are an important truck scale rating? ~ Bending a paper clip back and forth can cause it to break, therefore weighbridges shouldn't bend or they will break? ~ Higher CLC's result in greater deflection and fatigue?

Deflection ratios, when used as a method of “rating” or comparing weighbridges, can be easily manipulated and used to mislead the consumer. Much of the competitive hype is based on short weighbridge modules, concrete decks, and heavy-duty models, all of which lead to the least possible deflection and a means to position the product as being “better”. One competitor only highlights deflection of their shorter, concrete deck modules. As expected, a short weighbridge module will deflect less than a longer module when the same load is applied at mid-span. Another competitor claims to *lead the industry in standards* and mentions a deflection ratio for their heaviest duty model only to warn against any other scale that deflects more (*including their own?*).

There are simply too many variables in the overall design and construction of a truck scale for deflection ratios to be used as a meaningful indicator of quality, performance, or durability. If you carefully evaluate deflection statements made by proponents of such propaganda, they tend to be vague and misleading.

Critical Design Considerations

As various components of a truck scale are exposed to load stresses, their performance and longevity should have very little to do with span deflection. The structural members transferring load across the scale and at the sectional ends have stress limits that also affect scale life.

Some competitors use fewer longitudinal members to support the top plate. This can easily result in damaging stress levels from individual tire loads, regardless of mid-span deflection.

Avery Weigh-Tronix uses a greater number of longitudinal members that are 100% welded to both the top plate as well as the important, stress-carrying bottom plates not found on competitive models.

Weight sensors and their supporting structures are other critical areas where lesser designs can fail from high stresses, even with little weighbridge deflection. The Avery Weigh-Tronix Weigh Bar and its self-centering, self-checking support system have proven to be the most reliable in the industry and are supported by a 5-year warranty. The Weigh Bar has superior performance characteristics in truck scale applications when compared to the compression style load cells or shear beams used by other manufacturers.

Conclusion

Companies that promote deflection ratios as a measure of truck scale quality are playing on a customer's ignorance. They are attempting to sell a product characteristic that by itself gives no conclusive evidence of a longer scale life.

Avery Weigh-Tronix truck scales are designed and manufactured for maximum strength and service life at their rated capacity. They are professionally engineered in a way that limits stress throughout the entire structure to less than the steel fatigue limit at rated loads. More or less mid-span deflection than a competitive model is not an important factor in determining the service life or performance experienced by the customer.