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Testing the Maximum Span Load on a Vehicle Scale

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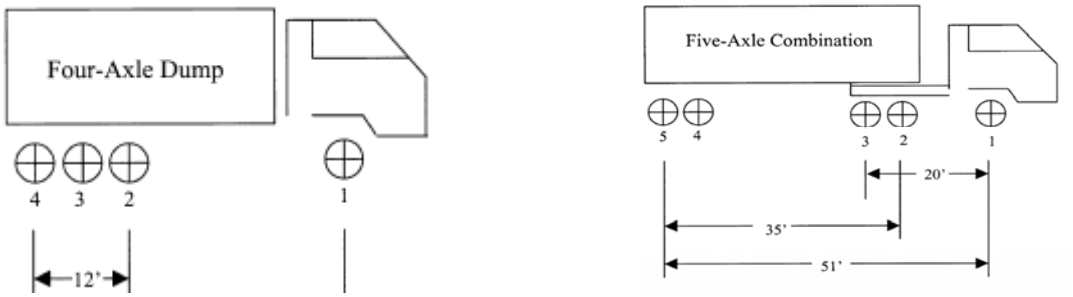
WMD has received a number of inquiries from field inspection personnel regarding the application of Scales Code, UR.3.2.1 and the accompanying Table UR.3.2.1., entitled "Span Maximum Load." This requirement and the accompanying table were originally introduced into NIST Handbook 44 to aid users in selecting a suitable vehicle scale and to establish a uniform method of rating the axle-load capacity of a scale so that manufacturers were provided a consistent basis for competition. It is equally important to recognize the field application of the requirement, i.e., it limits the amount of load a user is permitted to apply within a specified span of vehicle scale platform.

The varying ways that loads can be applied to a vehicle scale create different stresses within the weighbridge. For example, the force per unit area is generally greater for the wheels of a dual tandem axle truck than for block test weights. This is because all of the force of the load created by a dual tandem axle is applied to the scale platform within the narrow prints of the tires that support the dual tandem axle. While block test weights of equal mass may be applied over the same platform area as the tires supporting a tandem axle, the force per unit area of the platform is less because the load is spread over the entire area. As a general rule, the greater the area of platform consumed by a load, the greater the maximum loading allowed. Table UR.3.2.1. provides a list of multipliers which take into consideration the different stresses of various axle configurations. When applying this table, you will notice that as the length between the extremes of any two or more axles of a truck is increased, a higher factor is used to determine the maximum allowable load applied by those axles.

To determine if users are exceeding the maximum allowable loading of a platform span, it is necessary to measure the distances between the centers of the sets of axles of various trucks. When selecting trucks for the testing of span loads, attempt to select only the heaviest of loaded trucks. Also try to select trucks having a variety of different axle configurations. The factors listed in Table UR.3.2.1. to be applied are based upon the total number of axles contained within a given span and the distance in feet between the extremes of the first and last axle in that span. The maximum allowable loading of any platform span is the product of the marked concentrated load capacity (CLC) times the appropriate factor determined by the axle spacing. Once maximum span loading has been calculated for a specific set of truck axles, the actual weight of those axles is determined by weighing them together, as a group, on the scale. The total weight of those axles must not exceed the calculated maximum span loading.

The illustration shown below provides some examples of axle spacing measurements taken between the extreme centers of two or more consecutive axles on two popular types of truck. The illustration also shows the outer axles that are to be measured when testing maximum span loading for these two vehicles. The axle configurations of other types of

trucks can be similarly measured and used in testing. It is important to note, however, that axle spacing may vary greatly between trucks of the same type, and therefore measurements must always be taken for each truck selected for testing. Once the axle measurements have been obtained, verifying compliance is a simple matter of weighing the axles in each measured group and making certain that none of the groups exceed the calculated maximum load based upon the number of axles contained in each span. As can be seen from the illustration, all of the axle sets that have been measured can also be easily weighed together as a group on a vehicle scale.



For additional information concerning the maximum span loading of vehicle scales, contact Rick Harshman by e-mail at richard.harshman@nist.gov or by phone at 301-975-8107.