
Classification

Axle-Based vs. Length-Based



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Axle-Based vs. Length-Based

Obtaining vehicle classification data is an important part of the traffic data collection process. With most temporary count site locations there are two common ways to collect classification data; Axle-Based and Length-Based. The method you choose will depend on a variety of factors, such as the type of equipment available to you, your project requirements, the type of road you are collecting on, the level of detail needed and consideration for overall safety.

Axle-Based Classification

Axle-Based Classification is the most widely accepted form of vehicle classification in the United States. Although there is a degree of interpretation expected when analyzing axle classifications, the FHWA does provide a table of 13 classification categories to help keep things as uniform as possible. Axle classification provides very specific data about each vehicle, including axle spacing and number of axles. Data collection software, such as JAMAR's STARnext, can use this axle information to create class descriptions of each vehicle.



The example below shows that when using an axle-based classification, a passenger car pulling a trailer would be separated from a bus, and a tractor trailer, based on the unique axle configuration of each vehicle:



Passenger Car w/ Trailer

Axle Class 2



Bus

Axle Class 4



Tractor Trailer

Axle Class 10

Pros/Cons of Axle-Based Classification

Pro: Most widely accepted method in the United States.

Pro: Mostly standardized, with only a slight degree of interpretation.

Pro: Very specific data about each vehicle.

Con: Requires sensors/tubes to be installed in the roadway.

Con: Safety of personnel is a concern when working in the roadway.

Con: Longer set-up and breakdown times at each count site.

Con: Recurring expenses to replace sensors/tubes, tape, nails, clamps, etc.

****For various reasons, many traffic data collection projects require axle-based classification data. In these cases, it is required that a counter designed to collect that type of data, such as a JAMAR TRAX Pinnacle tube style counter, be used.***

Length-Based Classification

Compared to the specific info provided by axle-based classification, length-based classification provides a more general idea of vehicle types. However, length-based classification is quickly becoming more accepted and utilized.

Rather than installing sensors/tubes in the roadway, a length-based classification system is typically a non-intrusive setup. A device being used to collect length-based data, such as a JAMAR Radar Recorder, will send out a



signal to measure the length of each vehicle that passes. The resulting measurement can then be defined by the user as a specific vehicle class. Unlike the axle-based data mentioned above, the FHWA does not have a standardized table to define vehicle classes by length. This leaves room for a wide interpretation of how each vehicle length would compare to each axle class.

Continuing the above example, we can see below that although each of the vehicles shown fall into different axle classes, they could very well fall into the same length class:



Pros/Cons of Length-Based Classification

- Pro:** Non-intrusive set up; no need to enter roadway.
- Pro:** Increased safety of personnel in the field.
- Pro:** Fast set-up and breakdown at each count site.
- Pro:** No recurring expenses for supplies, accessories, etc.
- Con:** Less standardized format.
- Con:** Wide interpretation of how a given length compares to a specific axle class.
- Con:** Less specific than axle classification.

Compared to the specific info provided by axle-based classification, length-based classification provides a more general idea of vehicle types.

FAQs for Length-Based Classification

How Should Length Data Be Grouped?

How length data is grouped depends mainly on the parameters of your project and the level of detail needed. There are numerous examples and opinions that can be found online, but ultimately the best

length groupings will be determined by your specific project and needs. Most equipment manufacturers offer a variety of ways to group length data. Some manufacturers provide a predetermined (binned) grouping, such as Small-Medium-Large. Others may provide the actual measurements but limit the user to predefined groups. Others, such as JAMAR's STARnext*, offer more flexibility by providing all the individual measurements and allowing the user to determine the needed groupings.

*By default, JAMAR's STARnext Software provides length data in 13 groupings, increasing by appropriate increments. Since JAMAR Radars collect using the Per-Vehicle method, STARnext allows the data groups to be user defined, configured, named, etc.

When can Length-Based Classification Be Used?

Unless a project specifically requires the collection of FHWA axle specific classification data, length-based data is typically acceptable. It will be up to the user to define the best length groupings for their needs. If axle specific data is not required, a non-intrusive device can often be the best way to go. Any non-intrusive device should have a proven accuracy to that of a quality tube style counter. It should provide a time-stamp and a specific length for each individual vehicle, as well as each vehicle's direction, lane separation, volume, speed and gap.

What is a 'non-intrusive' device?

A non-intrusive device is a traffic data collector that does not require any physical components, such as sensors/tubes, to be installed in the roadway. When components are installed in the roadway, they require personnel to enter the roadway, which could create a safety issue. A non-intrusive device will typically install on the side of the roadway and collect vehicle data with radar technology. Since these non-intrusive devices do not have any physical components in the roadway, they are not able to collect the axle specific vehicle data. Instead, they will measure the length of each vehicle and classification can be made from those measurements.

For more information on this, and other related topics, feel free to contact JAMAR Technologies.

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