



The Compliance, Safety, Accountability (CSA) Safety Measurement System (SMS)

A plain English summary.

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The Federal Motor Carrier Safety Administration (FMCSA) uses its Safety Measurement System (SMS) to assess the relative safety of motor carriers and their compliance with safety regulations. The following is a simplified, plain-English guide to understanding the SMS, a component of the agency's Compliance, Safety, Accountability (CSA) program. It is intended only as a summary of the SMS. The full SMS methodology is available at this [link](#).

The Seven Measurement Categories (i.e., Basics)

The SMS uses crashes and violations primarily found during roadside inspections¹ in the prior 24 months to assess fleets in seven categories called *Behavioral Analysis Safety Improvement Categories* (i.e., BASICS). The seven BASICS and examples of the violations in each are below.

Category/Basic	Violation Examples
Unsafe Driving	Speeding, Following Too Closely, Improper Lane Change
Hours-of-Service Compliance	Exceeding the 11 Hour Rule, False Log
Driver Fitness	Expired Med Card, Driving While Disqualified
Controlled Substances/Alcohol	Use or Possession of Drugs/Alcohol
Vehicle Maintenance	Inoperable Lamps, Flat Tires, Brakes Out of Adjustment
HM Compliance	Improper Placarding, Incomplete Shipping Papers
Crash Indicator ²	Crashes Resulting in a Fatality, Injury, or Disabling Damage ³

Violation Weighting

Each violation is assigned a weight on a scale from 1-10 based on its severity.⁴ For instance, a missing mud flap carries a weight of one point while an inoperable headlamp carries a weight of six points. Also, if the violation was so severe as to warrant the vehicle being placed “out-of-service,” the violation is assigned an additional two points.

Crashes recorded in the system are weighted based on their severity too, but not on a 10-point scale like other categories. A crash resulting in an injury or fatality carries two points. A crash that only results in a vehicle being towed due to disabling damage (but

no injuries or fatalities) carries a weight of 1 point. Crashes that result in the release of hazardous materials accrue an additional point.⁵

Of importance: As you will see below, fleets are scored separately in each category and the points assigned for the relative severity of violations cannot be compared across categories. For instance, a violation assigned seven points in one category is not necessarily more severe than one that carries five points in another category. Similarly, a fleet having accumulated three points in the *Crash* category should not be considered “safer” than a fleet with 35 points in the *Vehicle Maintenance* category.

Time Weighting

The weights of these violations and crashes are then adjusted for age, with more recent events counting more than older ones. Inspections are time weighted too. The time weights, shown below, are essentially multipliers. For instance, an eight-point violation for driving on a bald tire that occurred in the prior six months would carry 24 points since recent violations carry a multiplier of three ($8 \times 3 = 24$).

Crash/Violation/Inspection Age	Time Weight Multiplier
0-6 Months	3
6-12 months	2
12-24 months	1

Comparative “Measures”

Within each category/BASIC, the SMS assesses “measures” of performance based on the carrier’s exposure. For the most part, these measures are effectively ratios of the number of violation points to the number of inspections (time weighted) conducted on the fleet in the prior 24 months. For instance, a fleet with a total of 78 time weighted points for vehicle violations incurred during 100 inspections that occurred more than a year ago (but less than 24 months ago) would have a “measure” of .78 (78 divided by 100). Of course, if the fleet had more inspections in the same period, say 200, but still only had a total of 78 time weighted points for violations (e.g., had lots of “clean” inspections) their measure would be much better – a .39 (78 divided by 200 = .39). A lower measure is an indicator of better performance (i.e. a safer fleet).

Fleets are assigned measures in each of the seven measurement categories/BASICs. In the *Unsafe Driving* and *Crash* categories, however, the measures are based on the carrier's size (e.g., truck count) rather than number of inspections.⁶ For instance, a fleet with an average of 100 trucks with 65 points for violations in the *Unsafe Driving* BASIC would have a measure of .65 in that category (65 divided by 100). Similarly, if the same fleet had a total of 34 points for crashes in the prior 24 months, its measure would be .34 (34 divided by 100). Of note, the SMS also includes a mileage adjustment for fleets that have above average exposure per truck based on high annual mileage.

Percentile Ranks

Next, the SMS places carriers into "Safety Event Groups" in each BASIC to compare the relative performance of fleets with ones that are similar in terms of size or exposure (e.g., number of inspections). For example, the table below shows the Safety Event Groups within the *Vehicle Maintenance*, *Hours of Service* and *Driver Fitness* BASICs.⁷

Safety Event Group Number	Number of Inspections in the Prior 24 Months
1	5-10
2	11-20
3	21-100
4	101-500
5	501+

Note – with some exception, fleets must have at least five inspections to be compared/ranked.

The system then ranks carriers within each group based on their measures. These ranks are expressed as comparative percentiles. Higher percentiles reflect worse performance. In other words, a fleet in the 99th percentile of a category is considered less safe and compliant than almost all other fleets in that measurement category.

For example, let's assume there were 100 fleets in group five of the *Vehicle Maintenance* BASIC, 80 of them had lower/better measures than ACME trucking and 19 had higher/worse measures. In this case, the fleet's percentile ranking would be 81. A percentile ranking is assigned in each of the BASICs based on the fleet's performance relative to fleets of similar size and exposure (generally the number of inspections).⁸

Intervention Thresholds

FMCSA has assigned “Intervention Thresholds” in each of the seven BASICs, based on percentiles.⁹ Carriers that are ranked above these thresholds are assigned an “alert” symbol and can be prioritized for an enforcement intervention of some type which usually consists of an on-site compliance review (i.e., audit).¹⁰ The thresholds for each BASIC are shown below.

Category/Basic	Intervention Theshold
Unsafe Driving	65th Percentile
Hours-of-Service Compliance	65th Percentile
Driver Fitness	80th Percentile
Controlled Substances/Alcohol	80th Percentile
Vehicle Maintenance	80th Percentile
HM Compliance	80th Percentile
Crash Indicator	65th Percentile

Note – the thresholds in most categories are lower for fleets that carry passengers (e.g., motor coach operators) and those that haul placarded quantities of hazardous materials.

Example

Here is an example that better illustrates how the SMS assesses a carrier’s relative safety performance and compliance with regulations.

ACME Trucking is a 100-unit fleet that had 120 vehicle inspections in the prior 24 months. These inspections have resulted in the following violations/points:

Violation	Severity Points	Violation Age	Age Multiplier	Total Points
Flat Tire	8	< 6 months	x 3	24
Inoperable Headlamp	6	< 6 months	x 3	18
Brake Hose Chafing	4	6-12 months	x 2	8
Missing Mudflap	1	6-12 months	x 2	2
Defective 5th Wheel	3	12-24 months	x 1	3
No Pre-Trip Inspection	4	12-24 months	x 1	4
			TOTAL	59

Of its 120 inspections, 20 occurred within the most recent six months, 35 occurred within the six months prior to that, and 65 occurred more than a year ago (but less than two years ago).

Inspection Age	Number of Inspections	Time Multiplier	Number of Time Weighted Inspections Total Points
0 < 6 months	20	X 3	60
6 months > 12 months	35	X 2	70
12 > 24 months	65	X 1	65
		Total	195

As a result, its measure in the *Vehicle Maintenance* BASIC was .30 (59 divided by 195). Assuming that more fleets in its Safety Event Group (group number 4 described above) had worse measures, ACME would have a very favorable percentile ranking (e.g., below the 50th percentile).

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¹ The system will also account for violations discovered during an investigation (i.e., audit) generally conducted at the motor carrier's place of business.

² Technically speaking, the Crash Indicator is not a BASIC, per se, but *is* one of the seven measurement categories.

³ Crashes considered in the methodology include those that result in a fatality, and/or an injury requiring treatment away from the scene of the crash or disabling damage to a vehicle requiring that it be towed from the scene.

⁴ In this context, severity is defined as the violation's relationship to crash occurrence and crash severity.

⁵ Only crashes meeting FMCSA's definition will be counted. They include those resulting in a fatality, injury requiring treatment away from the scene, or disabling damage requiring that a vehicle be towed from the scene.

⁶ The SMS relies on the average vehicle count over the prior 24 months, not the current vehicle count.

⁷ In the Unsafe Driving BASIC and Crash Indicator, the safety groups are based on the number of relevant inspection or crashes respectively. However, there are separate groups for carriers that primarily operate combination vehicles versus straight trucks.

⁸ Fleets are not ranked in most BASICs if they incurred no violations (in that BASIC) in the prior 12 months and no violations in that BASIC during the most recent inspection.

⁹ The thresholds are set lower for those BASICs which have a stronger correlation to crash risk and crash severity.

¹⁰ Fleets can also be assigned an alert symbol in a BASIC of their most recent enforcement intervention (e.g., audit) reflected violations in that BASIC or if an investigation revealed a failure to comply with insurance, registration or other reporting requirements.