



COMPREHENSIVE SAFETY ANALYSIS (CSA) 2010 HOW IT WORKS



Introduction

CSA 2010 is a system that uses primarily roadside inspection and crash data to measure carrier safety performance, identify potentially unsafe carriers, and prioritize them for various enforcement interventions. The first section of this document provides a general overview of the program. The following sections provide more details about each component of the system.

Section 1 – Overview

The CSA process consists of several steps. In the first step, CSA 2010 takes each carrier’s safety events (e.g., roadside inspection violations and crashes) and places them into their respective groups called *Behavioral Analysis and Safety Improvement Categories* (BASICS). Then, the events are assigned a numerical weight based on severity and age.

Within each category, measures of performance (time and severity weighted violations and crashes) are adjusted based on either the carrier’s size (number of trucks) or exposure (number of inspections).



Using these adjusted measures, carriers are then assigned scores in each category which represent a percentile ranking compared to carriers of like exposure. Carriers whose scores are deemed deficient (much worse than for carriers with similar exposure) are selected for various FMCSA enforcement interventions – such as warning letters or investigations. Sometime in the future, perhaps two years from now, the system will also be used to assign a safety fitness determination like the safety ratings that are assigned to carriers today.

Section 2 – Categorizing Violations into BASICS

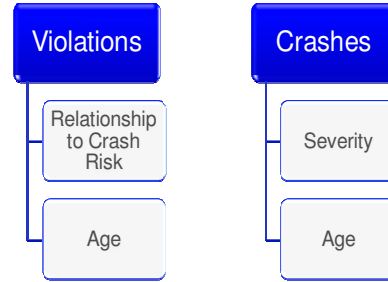
Each violation is assigned to one of six categories called BASICS. The following table lists these categories and examples of the types of violations that would be placed into each.

BASIC	REGULATORY SECTIONS COVERED	VIOLATION EXAMPLES
Unsafe Driving	Parts 392 & 397	Speeding, Following Too Closely, Improper Lane Change
Fatigued Driving (Hours-of-Service)	Parts 392 & 395	Hourly Violations (11,14, 60/70 hour), Form and Manner, False Log
Driver Fitness	Parts 383 & 391	Expired Med Card, Improper Endorsements, Driving While Disqualified
Controlled Substances/Alcohol	Parts 382 & 392	Use or Possession of Drugs/Alcohol
Vehicle Maintenance	Parts 393 & 396	Lighting, Brake Adjustment, Tire Depth
Cargo-Related	Parts 392, 393, 397 & HM	Improper Placarding, Load Securement

There is a 7th category called the *Crash Indicator*. In this category, the system tracks all crashes reported to DOT's central database - the *Motor Carrier Management Information System (MCMIS)* - in the prior 24 months which meet FMCSA's definition of an accident (occurrence involving a commercial motor vehicle resulting in fatality, or injury treated away from the scene, or disabling damage requiring tow away).

Section 3 – Weighting Violations and Crashes

After violations and crashes are placed into their respective categories, they are weighted based on both time and severity. More severe crashes and violations count more (bear more weight), older violations/crashes count less.



The weight of each violation is first determined based on its relative relationship to crash risk. In other words, those violations that have a stronger statistical relationship to crashes bear more weight. Every violation has been assigned a numerical weight on a scale of 1-10, with 10 being the most severe. Also, if the violation was so severe as to warrant an out-of-service order, the violation is assigned an additional two points. Some examples of violations and their relative weights are shown below.¹

Violation	Severity Weight
Reckless Driving	10
Failure to Use a Seat Belt	7
Improper Lane Change	5

The same holds true for crashes. Severe crashes - those resulting in fatality or injury requiring treatment away from the scene - bear twice as much weight as those that merely result in disabling damage requiring tow away.

Crash Severity	Severity Weight
Injury or Fatality*	2
Tow-away only*	1

**Note: If an HM release results from the crash, add 1 to the overall weight (e.g., tow-away and HM release = 2)*

The weights of these violations and crashes are then adjusted for age, with more recent events counting more than older ones.

Crash/Violation Age	Time Weight
0-6 months	3
6-12 months	2
12 – 24 months	1

¹ The sum of all severity weights yielded by any one inspection for violations in any one BASIC is capped at a maximum of 30. This cap of 30 is applied before the severity weights are multiplied by the time weight.

The total time and severity weighted value is then determined by multiplying each violation's severity weight by the appropriate age weight.

Example:

$$\begin{array}{ccccccc}
 5 & \times & 3 & = & 15 \\
 \textit{Severity Weight} & & \textit{Time Weight} & & \textit{Total Time and} \\
 & & & & \textit{Severity Weight}
 \end{array}$$

Section 4 - Measures Adjusted for Exposure

Once the violations and crashes have been placed into their proper categories and weighted based on time and severity, a “measure” of performance in each category can then be calculated. To do so, we must first adjust for carrier size and exposure. It would not make sense to assume a large carrier is less safe, for example, simply because they have more adverse safety events (e.g., crashes and violations) than a small carrier. We must put these raw numbers in the context of the carrier's size and exposure.

For the *Unsafe Driving BASIC* and the *Crash Indicator*, the measure is determined by taking the total of all time and severity weighted crashes or violations in that category and dividing it by the number of power units that the carrier operates. If the carrier generates more exposure than average with its vehicles (i.e. operate more miles per truck than the average) a *Utilization Factor* is also applied to the denominator.

The means for calculating utilization is different for carriers that primarily operate combination truck fleets than for those that primarily operate straight truck (single unit) fleets. This approach accounts for the fact that combination trucks and straight trucks typically operate in very different environments (e.g., urban vs. rural) with very different risk exposure. A fleet is considered primarily a combination truck fleet if 70% or more of the fleet is comprised of combination unit vehicles. Conversely, a fleet is considered a straight truck fleet if more than 30% of its trucks are single unit vehicles.

The *Utilization Factor* is determined by first taking the carrier's vehicle miles traveled (VMT)² and dividing it by the carrier's average number of power units. This gives us an average mileage per power unit. If the mileage per power unit reflects greater than average asset utilization then a *Utilization Factor* is applied to adjust for the added exposure created by the additional mileage operated. The chart below shows the *Utilization Factor* that should be applied depending on fleet type and average mileage per power unit.

<i>Utilization Factors</i>			
Straight Fleets		Combination Fleets	
VMT per Average PU	Utilization Factor	VMT per Average PU	Utilization Factor
< 20,000	1	< 80,000	1
20,000 – 60,000	VMT per PU / 20,000	80,000 – 160,000	1 + .6(VMT per PU – 80,000)/80,000
60,000 – 200,000	3	160,000 – 200,000	1.6
> 200,000	1	> 200,000	1
No Recent VMT Info	1	No Recent VMT Info	1

² As reported on the carrier's MCS-150 form

Here's an example of how to calculate your utilization factor.

- 1) Let's assume you have 5 trucks and operate a total of 600,000 miles annually. Your average mileage per truck would be 120,000 miles (600,000 / 5 = 120,000).
- 2) As reflected in the chart above, for a fleet with average mileage in this range the system will add a *Utilization Factor* based on mileage operated. Here's how:
- 3) First, take your average mileage per power unit and subtract 80,000 (e.g., 120,000 - 80,000 = 40,000).
- 4) Next, divide the resulting figure by 80,000 (40,000 divided by 80,000 = .5)
- 5) Then, multiply the resulting figure by 0.6 (.5 x .6 = .3).
- 6) Finally, add the resulting figure to "1" to determine your utilization factor. In this instance the factor would be 1.3.

So in this example of a carrier with 5 trucks each averaging 120,000 miles, the carrier's denominator for calculating its BASIC *measures* would be 6.5 (5 trucks times a utilization factor of 1.3).

Assuming, for example, that the total of all time and severity weighted violations in the prior 24 months in a given BASIC for this carrier was 28, we can now determine the carrier's *measure* in this BASIC. By dividing 28 by the adjusted exposure figure (6.5), we arrive at a BASIC *measure* of 4.3.

For the Following Basics:
Unsafe Driving & Crash Indicator

$$\text{Measure} = \frac{\text{Number of Violations/Crashes (Time and Severity Weighted)}}{\text{Number of Power Units * Utilization Factor}}$$

Example: $\frac{28}{6.5} = 4.3$
(5 x 1.3)

It is important to note that the system uses the number of driver inspections as the denominator in the driver-related BASICS, and vehicle inspections as the denominator in the vehicle-related BASICS. Therefore, the number of driver inspections is the denominator for the *Fatigued Driving* (HOS), and *Driver Fitness* measures, while the number of vehicle inspections is the denominator the *Vehicle Maintenance* and *Cargo-Related* measures.

For the Following Basics:
Fatigued Driving - Vehicle Maintenance - Cargo Related - Driver Fitness

$$\text{Measure} = \frac{\text{Number of Violations (Time and Severity Weighted)}}{\text{Number of Relevant Inspections}}$$

Example: $\frac{38}{10} = 3.8$

In the *Controlled Substances/Alcohol BASIC*, the number of inspections resulting in a controlled substances or alcohol violation is used.

Why are inspections used as the denominator for some BASICS and power units for others? you might ask. Some violations in certain BASICS are the trigger for an inspection, not simply the result of an inspection. For example, a driver stopped for speeding is almost always assigned a speeding violation. If the number of inspections was used as a denominator in this instance, the relationship would almost always be one for one. So for the BASICS in which violations trigger an inspection - *Unsafe Driving* and *Crash Indicator* –performance is measured not based on number of inspections, but on carrier size and exposure.

Section 5 - Safety Event Groups

In order to determine a carrier's performance relative to carriers with similar exposure, each carrier must be placed into safety event groups. This tiered approach also accounts for the greater variability in violations and crash rates for smaller carriers based on small samples or limited levels of exposure. For instance, a single crash can cause a small carrier's crash rate to double. Safety event groups help ensure that similarly situated carriers are treated fairly.

In each BASIC, safety event groups are based on the carrier's number of relevant inspections. The safety event groups for the *Crash Indicator* are based on number of crashes.

The respective *Safety Event Groups* are shown below. As you will see, in the *Crash Indicator* and *Unsafe Driving* BASIC, there are different *Safety Event Groups* for combination unit fleets and straight truck fleets.

Unsafe Driving		
Safety Event Group	Number of Inspections Combo Truck Segment	Number of Inspections Straight Truck Segment
1	3-8	3-4
2	9-21	5-8
3	22-57	9-18
4	58-149	19-49
5	150+	50+

Fatigued Driving - Vehicle Maintenance Cargo Related - Driver Fitness	
Safety Event Group	Number of Relevant Inspections
1	3-10 (Fatigue Basic); 5-10 (Fitness Basic)
2	11-20
3	21-100
4	101-500
5	501+

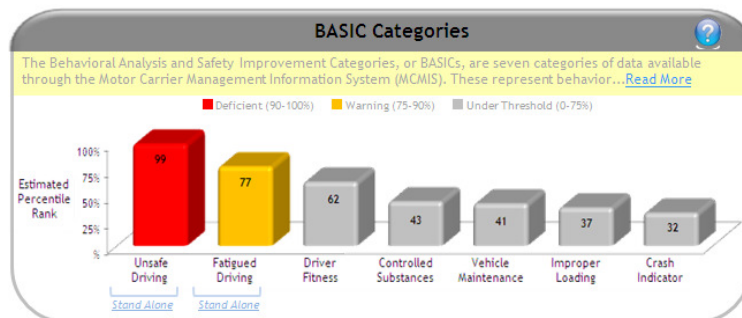
Crash Indicator		
Safety Event Group	Number of Crashes Combo Truck Segment	Number of Crashes Straight Truck Segment
1	2-3	2
2	4-6	3-4
3	7-16	5-8
4	17-45	9-26
5	46+	27+

Controlled Substances/Alcohol	
Safety Event Group	Number of Relevant Inspections
1	1
2	2
3	3
4	4

Section 6 – Scores and Thresholds

Once carriers' BASIC measures have been placed into peer groups, the system assigns a score for each BASIC. In effect, the score is the carrier's percentile rank (on a scale of 1-100) of its relative safety performance in that BASIC.

The worse the carrier's performance relative to others in its peer group, the higher its score will be. When a carrier receives a high score in any given BASIC or in the *Crash Indicator*, it is considered to be deficient.



The threshold for determining if a carrier is deficient in a BASIC varies based on the particular BASIC and the carrier's type of operation (e.g., passenger carrier, hazmat carrier). Presumably this is the case not because certain types of carriers are more crash prone, but because they have a greater potential for harm when a crash does occur.

BASICs/Indicator: Unsafe Driving - Fatigued Driving - Crash Indicator	
CARRIER TYPE	THRESHOLD PERCENTILE
Most Carriers	65%
Hazardous Materials	60%
Passenger	50%

BASICs: Driver Fitness - Drugs/Alcohol - Cargo Related Vehicle Maintenance	
CARRIER TYPE	THRESHOLD PERCENTILE
Most Carriers	80%
Hazardous Materials	75%
Passenger	65%

Section 7 – Intervention

Carriers that cross a threshold and are determined to be deficient in any BASIC are targeted for an enforcement intervention. These interventions take one of the following forms.

INTERVENTION TYPE	DESCRIPTION
Warning Letter	A letter is sent to a carrier's place of business. It specifically identifies the deficient BASIC(s) and outlines possible consequences of continued safety problems. The warning letter provides instructions for accessing carrier safety data so that the carrier can identify ways to improve its safety management controls.
Targeted Roadside Inspections	The carrier's trucks are targeted for roadside inspections. The system also provides roadside inspectors with information that identifies the carrier's specific safety problems.
Off-Site Focused Review (Records Request)	The carrier is directed to send records relating to a specific area (e.g., vehicle maintenance) in which the carrier's performance has been deficient. If the carrier does not submit requested documents they may be subject to an on-site investigation or the records may be subpoenaed.
On-Site Focused Review	Investigators appear on-site at the carrier's place of business to conduct a review of records relating to a specific area in which the carrier's performance has been deficient. An on-site focused investigation may be selected when the carrier is found to be deficient in two or fewer BASICs.
On-Site Comprehensive Review	An On-Site Comprehensive Review is a thorough review conducted by safety investigators at the carrier place of business. This review includes all areas of a carrier's operations, not merely those that have been identified as being deficient. It is used when the carrier has a continually deficient BASIC, multiple deficient BASICs (three or more), a fatal crash, or a complaint.

It is important to note that while the intent is for interventions to be progressive, FMCSA may skip steps in the process based on the frequency and severity of violations. In other words, if a carrier is seriously deficient in any one BASIC or generally deficient in several BASICs, FMCSA may bypass the warning letter stage and may immediately initiate a records review.

Section 8 – Intervention Consequences or “Follow-ons”

As a result of an intervention, FMCSA may mandate any one of a number of consequences or “follow-ons,” as the agency terms them. They are as follows:

Cooperative Safety Plan (CSP) - The CSP is a voluntary safety improvement plan initiated by the carrier. The carrier and FMCSA collaboratively create a plan, based on a standard template, to address the underlying problems resulting from the carrier's substandard safety performance.

Notice of Violation (NOV) - The NOV is a formal notice of safety deficiencies that requires a response from the carrier. It is used when the violations discovered are severe enough to warrant formal action but not a civil penalty (fine). It is also used in cases where the violation is immediately correctable and the level of, or desire for, cooperation is high. To avoid further intervention, including fines, the carrier must provide evidence of corrective action.



Notice of Claim (NOC) - An NOC is issued in cases where the regulatory violations are severe enough to warrant assessment and issuance of civil penalties.

Settlement Agreement - A *Settlement Agreement* is a contract negotiated with the carrier to enact remedies that address the root cause of a safety problem, defer or reduce penalties, or terminate enforcement proceedings.

Operations Suspended/Unfit to Operate – A suspension order is an order for the motor carrier to cease operations. It is issued to carriers who are continuously and seriously deficient and if other interventions fail to bring about a needed change in behavior.

Section 9 – Safety Fitness Determinations

In the near term, CSA 2010 will be used to identify carriers whose performance is deficient and to subsequently trigger appropriate interventions. These interventions could result in a change to the carrier’s safety rating (e.g., Satisfactory, Conditional, Unsatisfactory) based on the existing safety rating methodology found in 49 CFR Part 385.

FMCSA’s long term goal is to use the CSA 2010 system as a replacement for the current rating methodology. However, it is important to note that this change cannot occur until FMCSA has completed a regulatory rulemaking to change the rating methodology.

FMCSA has indicated that they plan on beginning this process in the first quarter of 2011. This change could take two years or longer to complete. Until that time, the current rating methodology will continue to be used.

Naturally, we will not know what the new system will look like until the rulemaking has been completed. However, we do know that FMCSA currently envisions assigning safety fitness determinations (e.g., ratings) monthly based on each carrier's CSA 2010 BASIC scores. These labels of a carrier's safety performance will likely be called "Continue to Operate" for carriers with acceptable safety performance, "Marginal" for those carriers who are deficient in one or more BASICs, and "Unfit to Operate" for those carriers found to be seriously deficient, usually in more than one BASIC.

Questions and Contact Information

If you have additional questions about CSA 2010, feel free to contact Rob Abbott rabbott@trucking.org or Boyd Stephenson bstephenson@trucking.org of the ATA Safety Department.