Driver Performance Scoring

Drivers are graded by a single overall score according to their safety record on a simple numerical scale from 0.0 to 5.0. The best possible score is a 5.0 and the lowest possible score is a 0.0. Drivers with lower scores are often perceived as high-risk, based on their historical driving performance.

4.1 – 5.0	**Excellent Driver – little or no penalties recorded**
3.1 – 4.0	**Good Driver – penalties recorded, but not excessive**
2.1 – 3.0	**Fair Driver – coaching needed**
1.1 – 2.0	**Poor Driver – at a high risk for a crash**
0.0 – 1.0	**Very Poor Driver – take the keys away!**

Figure 74 Driver Scoring Range

Score Categories

The Overall Score is a combination of scores achieved in three (3) categories: Speed, Driving Style, and Seat Belt Compliance. The driver will earn a score for each score category that is a weighted measure of the count and severity of violations in that category. We factor the total number of miles driven in order to make the score fair.

Category	Description
Speed	The most important category because speed is directly linked to injuries.
Driving Style	Besides speed, the general handling of the vehicle and choices made by the driver.
Seat Belt Compliance	Driver compliance with safety systems and rules both in and out of the vehicle.

With category scores, we can quickly get coaching insight for drivers. The image below is a snippet from a report showing a list of drivers with an **Overall Score**, a **Speed Score**, a **Driving Style Score**, and a **Seat Belt Compliance Score**. The scores are sorted by Overall Score, in descending order, ranking the drivers as most safe to most unsafe based on the overall criteria.

Driver:	Distance Driven	Overall	Speed	Style	Seat Belt
Curtis Orr	192.2 mi	4.5	4.3	5.0	5.0
Scott Vecchiarelli	7,710.8 mi	4.0	3.9	4.2	3.9
Mark Hawes	487.3 mi	4.0	3.4	5.0	5.0
Dan Ashby	4,894.6 mi	3.6	3.5	3.5	4.1
Scott Butler	3,898.7 mi	3.5	3.2	3.4	5.0
Dave Harry	2,047.5 mi	3.5	4.0	2.8	5.0
Steve Forsling	4,323.7 mi	3.4	3.9	2.7	5.0
Ethan Story	6,486 mi	2.9	2.9	2.4	5.0
Josh Huber	7.6 mi	2.9	1.7	5.0	5.0
Grant Keaton	4,888.6 mi	2.6	3.1	1.7	5.0

Figure 75 Score Ranking ordered by Overall Score

With the category scores available, we can easily ask and answer questions about each of the categories, such as:

- Who is the worst offender with respect to seat belt compliance?
- Who are the best with respect to compliance?
- Who handles the vehicles the worst?
- Who has the worst speeding score?

Just by sorting the report list again like the next example snippet ***(Figure 76)***, we see an entirely different ranking. This time it is sorted by **Speed Score** in descending order. If you compare the two snippets there are obvious, simple conclusions, like "Having looked at the ranking for speed and driving style, I conclude most drivers in this population follow compliance (wear seat belts) but handle the vehicle badly."

Driver:	Distance Driven	Overall	Speed	Style	Seat Belt
Charlie Knudsen	0 mi	1.8	5.0	0.0	5.0
Curtis Orr	202.9 mi	4.5	4.3	5.0	5.0
Dave Harry	2,047.5 mi	3.5	4.0	2.8	5.0
Scott Vecchiarelli	7,710.8 mi	4.0	3.9	4.2	3.9
Steve Forsling	4,362 mi	3.4	3.9	2.7	5.0
Dan Ashby	4,921.1 mi	3.6	3.5	3.5	4.1
Mark Hawes	487.3 mi	4.0	3.4	5.0	5.0
Scott Butler	3,918.2 mi	3.5	3.2	3.4	5.0
Grant Keaton	4,888.6 mi	2.6	3.1	1.7	5.0

Figure 76 Score Ranking by Speed Score

Then you can look at performance scores in sub categories to get even more insight. For example, look at this dashboard for just the Speed Score for a single driver ***(Figure 77)***. The dashboard separates speeding violations into speed limit categories and then calculates a score for each category. With a glance, you can see this person drives over the speed limit in 1-30 mph zones most often, likely in residential areas.

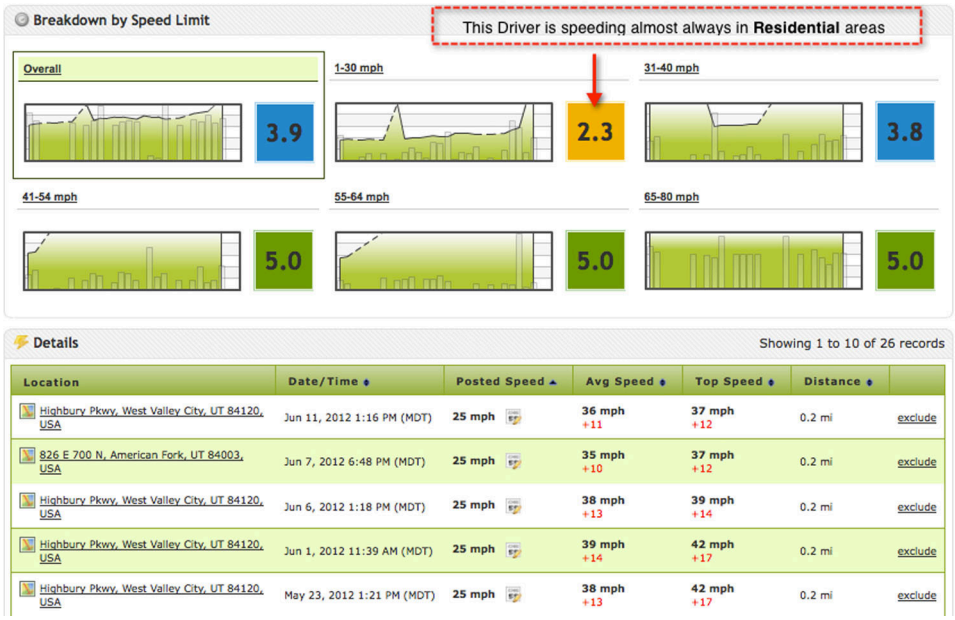

Figure 77 Speed Score Breakdown by Speed Limit

You need to keep the category scores close at hand for another reason: various vehicles with various configurations will hide bad behavior in any Overall Score. If you only look at the Overall Score and you have vehicles that can't monitor certain categories, the driver's score will default to 100% in those categories. Let us explain through a simple example:

Overall Score Example

Trucks and Monitors

Driver A: Drives a vehicle with Speed by Street monitoring, aggressive driving monitoring (brakes/turns) and seat belt monitoring.
Driver B: Drives a vehicle with top speed monitoring, aggressive driving monitoring (brakes/turns) and no seat belt monitoring. The vehicle is equipped with a speed governor.

Driving History

Driver A speeds occasionally, rarely performs an aggressive or unsafe turn, and wears his seat belt most of the time.
Driver B has many aggressive turns. (Due to the equipment installed, we don't know much else about Driver B.)

Scoring

Suppose we use a simple formula to calculate the overall score:

$$OverallScore = (0.4 \times \text{SpeedScore}) + (0.4 \times \text{StyleScore}) + (0.2 \times \text{ComplianceScore})$$

Driver	SpeedScore	StyleScore	ComplianceScore	OverallScore
Driver A	3.5	4.0	4.0	**3.8**
Driver B	5.0	**1.0**	5.0	**3.4**

Figure 78 Overall Score Example

The example ***(Figure 78)*** shows how two drivers end up with similar Overall Scores because Driver B will always get a perfect score with respect to speed and compliance. Driver B has a terrible Driving Style Score and will likely tip over a vehicle soon. But the Overall Score doesn't show how serious his situation has become.

We considered several approaches to solve the problem of looking at just the Overall Score. We considered calculating the Overall score as:

- The least of the 3 scores
- The root-mean-square of the 3 scores
- The least square of the 3 scores
- Various other weights applied to each category

In the end, we concluded the best way to look at scoring is to keep the Overall Score calculation simple and consider the category scores individually as well.

The Penalty Concept

To envision a scoring system wherein new and various types of equipment and monitors could come into play, we looked at all our recorded history of driving behavior and arrived at basic expectations about the amount and severity of driving violations. It occurs to us that you have to take each behavior as an individual case and test those same expectations in that context. In some cases, we had to look at large volumes of measured driving data to come up with a percentile ranking of the drivers. For example, we looked at the hard turn driving history of thousands of drivers to formulate a method to assign a risk to each driver.

Based on the idea that individual behaviors must have both unique risks and unique frequency of occurrence, we propose the concept of a unique penalty for each. The idea is simple: once you start driving, you have a good score and any bad or unsafe behaviors will decrement that score in a particular way depending on the specific violation. The amount you r score will decrease must be based on a subjective measure of safety, usually formulated following a thorough analysis of real drivers.

Unlike a school classroom where you have to earn your grade, our scoring system assumes you are a good driver and gives you a perfect score on your first mile. After that, it's up to you as a driver and your behavior given the equipment you use and the expectations for compliance from your company.

To keep your good score, you have to avoid incurring a **Penalty**, of which there may be several types. The basics of our penalty concept are:

- Everyone starts with an "A" or a 5.0 score
- Penalty is the inverse of score, as penalties accrue scores go down
- Bad behavior decrements your score
- You can add new penalties
- You can assign a relative value to each penalty
- You can tailor the severity of a penalty based on a subjective measure of relative risk
- Assign penalties to a category - speed, driving style, compliance
- Sum penalties in each category to calculate a score for that category

The penalty concept makes driver scores fair for several reasons. First, if the truck lacks the equipment or the monitor for a certain penalty, then the penalty just goes away. Drivers find that more than fair. Second, penalties have severity based on the specific violation or "the punishment fits the crime." Third, penalties fit into a specific score category resulting in a balanced overall score for a driver with one bad habit. For example, a person who never wears a seat belt (who may be fired anyway) will get a Compliance Score of 0.0 as a result of the penalty but could maintain a relatively normal overall score. That type of scoring appeals greatly to a person's sense of fairness.

User Tip: inthinc® Portal Scoring Document

For more information about the inthinc portal scoring system, including mathematical formulas used to calculate driver scores, refer to the **inthinc Portal Scoring System** document which can be found at inthinc™ University *(https://training.inthinc.com/iu)* under the "Resources" section of the site.

Calculating the Overall Score

We calculate the Overall score based on the category scores as follows:

OverallScore = (0.4 x SpeedScore) + (0.4 x StyleScore) + (0.2 x ComplianceScore)

Or equivalently, since Penalty is the inverse of the Score:

OverallScore = 5.0 - (0.4 x SpeedPenalty) - (0.4 x StylePenalty) - (0.2 x CompliancePenalty)

We have pointed out that the weighting of each category score is not as important as viewing Overall Score, Speed Score, Driving Style Score, and Compliance Score together.

How Violations Drop

Driver scores are normalized over a period of time. Normalization of scores is intended to create greater objectivity in driver performance management. The more hours and days driven after the last violation, the better the driver's score becomes when compared to a similar time frame. For example, a violation that occurred on Day 1 will not be included on a "7 Days" score when the latest score is viewed on Day 9.

Excluding Violations

If you are an administrator or if your user role allows, you can selectively exclude (or forgive) a driver violation from a Notification page, the Driver Performance dashboard, or the Team Performance dashboard. After excluding a violation, the impact will not be immediately noticeable. Data within the portal aggregates daily, at which time driver scores will be updated to reflect any violations that have been excluded. For more information, refer to ***"Excluding Notifications" on page 93.***

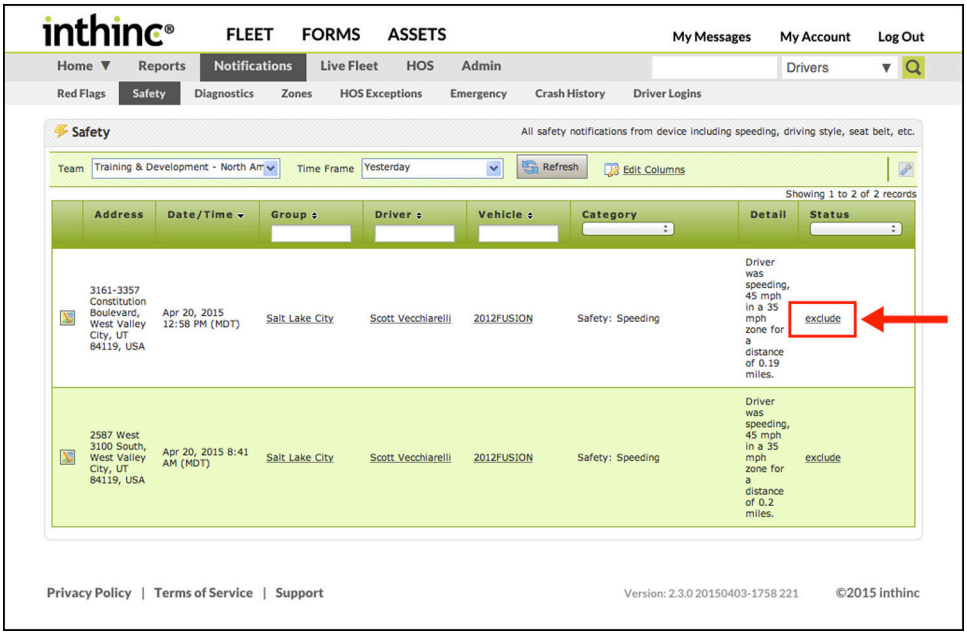

Figure 79 Exclude link highlighted