THOUGHT LEADERSHIP

Before the crash: speed data as a leading indicator

Giedo Donkers · November 9, 2026

Crash records tell us where people were hurt. Actual speeds show where the risk is building, also on roads where the crash record is still thin. Floating Car Data makes that visible across the whole network.

Crash records remain the foundation of every road safety program. They also have a built-in limitation: by the time a crash is in the data, someone has already been hurt.

That is why the Safe System Approach asks agencies to act on risk, not only on crash history. The question is which risk indicators are reliable enough to act on. Speed is the most important one.

Why speed comes first

Speed affects both whether a crash happens and how severe it is. The faster a vehicle travels, the longer the stopping distance and the higher the impact energy. For people walking and biking, the difference between a collision at 20 mph and one at 40 mph is often the difference between an injury and a fatality.

Speed is also measurable everywhere, every day. Crashes are rare at the level of a single intersection or roadway segment. A location can be dangerous for years before the crash record shows it. Speeds, on the other hand, are driven past that location thousands of times a week.

What Floating Car Data adds

Speed measurements used to come from loop detectors or temporary counts: accurate, but only at the spots where someone placed them. Floating Car Data changes that. HERE derives speeds from millions of anonymous vehicle movements per day, which makes actual speeds available for the whole network, from freeways to residential streets.

For each roadway segment, that gives a picture of how traffic really behaves:

- the average speed and the 85th percentile speed,
- the share of vehicles above the posted speed limit, and how far above it,

- how speeds develop over the day, the week and the years.

Delay belongs in the same picture. A low average speed can mean a calm street, but also a congested one. Looking at delay alongside speed prevents a congested arterial from being mistaken for a safe one.

Use it responsibly

Floating Car Data is a sample of traffic, not a census. That calls for care:

- **Check the sample.** On quiet streets the number of measurements can be small. A speed figure is only as reliable as the number of observations behind it.
- **Compare with the right limit.** Speeding can only be judged against the posted speed limit of that specific segment, so the limit data has to be as good as the speed data.
- **Look over time.** A single month can be distorted by roadwork, events or weather. Trends over longer periods tell more.

Speed and crashes together

Speed data does not replace crash data; the two strengthen each other. A location with high crash numbers and structurally high speeds tells a different story from one where crashes occur at modest speeds. And a location with high speeds but few crashes yet is exactly where proactive work can make a difference: before the crash, rather than after it.

After a countermeasure, speed is also the first indicator to respond. Where crash numbers need years to show an effect, a before/after comparison of actual speeds shows within months whether drivers behave differently.

From hindsight to foresight

Combining crash records with actual speeds turns road safety from looking back into looking ahead. It helps an agency see where risk is building, explain why and act before the crash.

Giedo Donkers presents this approach in session TS2.5 at R2T in Santa Clara.