# How to work with safety analysis in the SWISSTRAFFIC.ai Viewer?

Analyse near-by collisions, post encroachment time, heavy braking and other safety data in your video.

Are you designing a new concept of a street or need to identify **dangerous situations** based on **interactions between vehicles?** Use our **safety analysis** that can provide you data about **near-by collisions, post encroachment time** or **heavy braking** in your video. You can export these data to a .CSV file for further analysis as well.
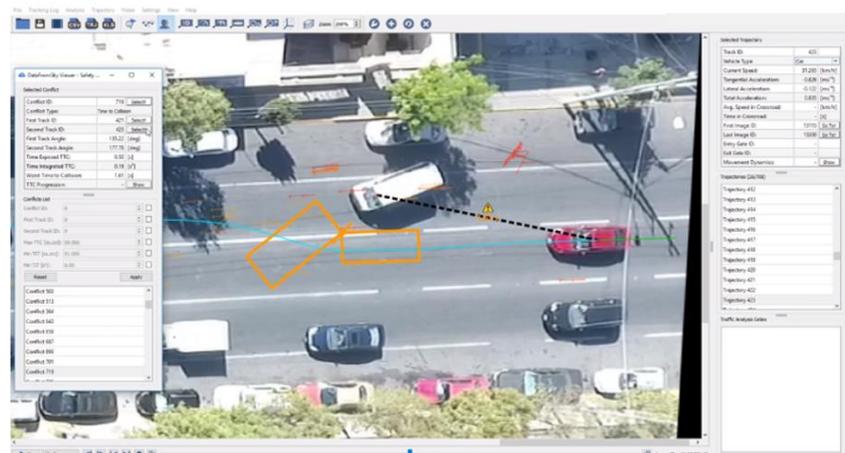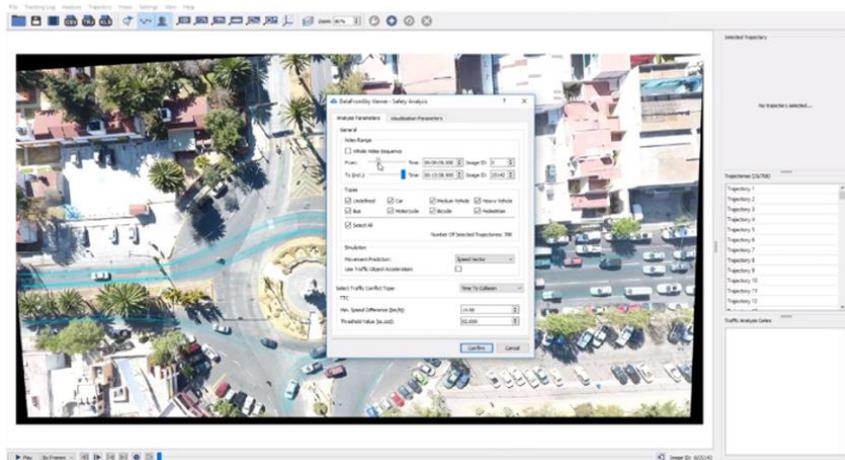
You can **set your own Safety analysis** parameters in Analysis – Safety Analysis – Safety Analysis. In the same menu, you can choose the possibility to **Show Safety Analysis Conflicts List.** This option shows you the **list of detected conflicts** that you can go through in a video and **export data** out of it to a .CSV file (in the same menu under Export Safety Analysis to .CSV File).
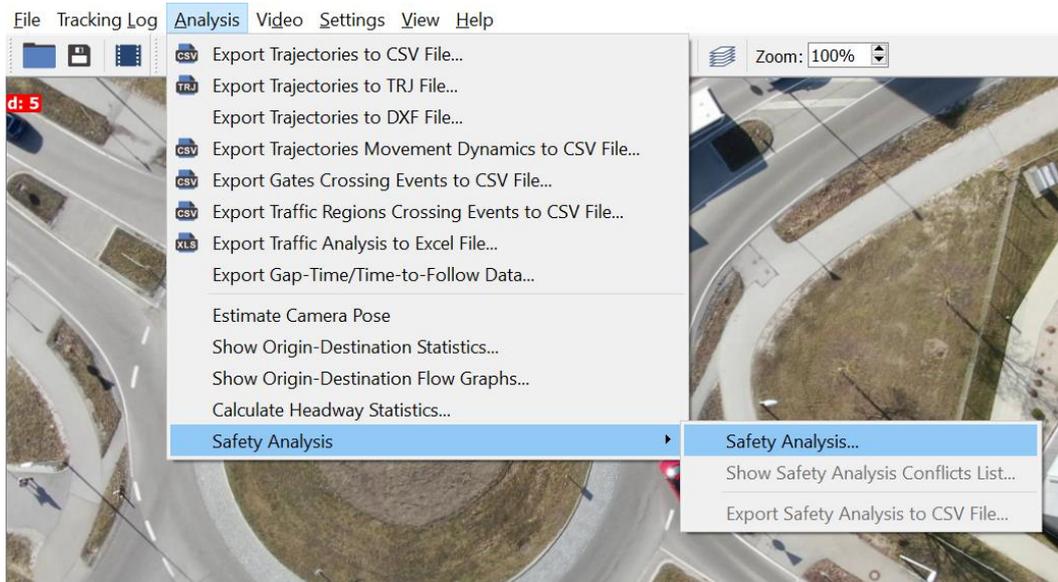
Near-by collision

Near-by collision will detect **time to collision** in case vehicles would be **moving at a constant speed and direction** at that moment. You can define which near-by collisions should be listed by setting the **limit for time to collision** (for example 2 seconds from the collision) or **minimal speed difference** of both vehicles.

In this case, both detected objects are marked by orange colour, the same colour are boxes interpreting position of vehicles in a time of possible collision. Time to collision is marked by black line with time to collision information.

If you work with time to collision you can choose whether you want to identify risky situations for the **whole duration of the video** or only **for a part of it, type of the vehicles** that you want to include to the analysis and **two models for the movement prediction** of vehicles:

- **Speed Vector** – This is a simple calculation where the movement of the vehicle is considered straight forward. For this reason, the calculation of collisions in a curve is not entirely accurate, but the calculation is less demanding.

- **Ackerman Steer Model** – This is a more precisely defined vehicle model, the calculation is based on the angle of wheels, but for this reason, the calculation is more demanding and takes more time.

Once you confirm your settings, **conflict list appears**. You can **go through each Conflict** and play the video to see the whole scene. Once you click to TCC Progression: Show, **graph of Time to Collision in relation to Video Time** shows.
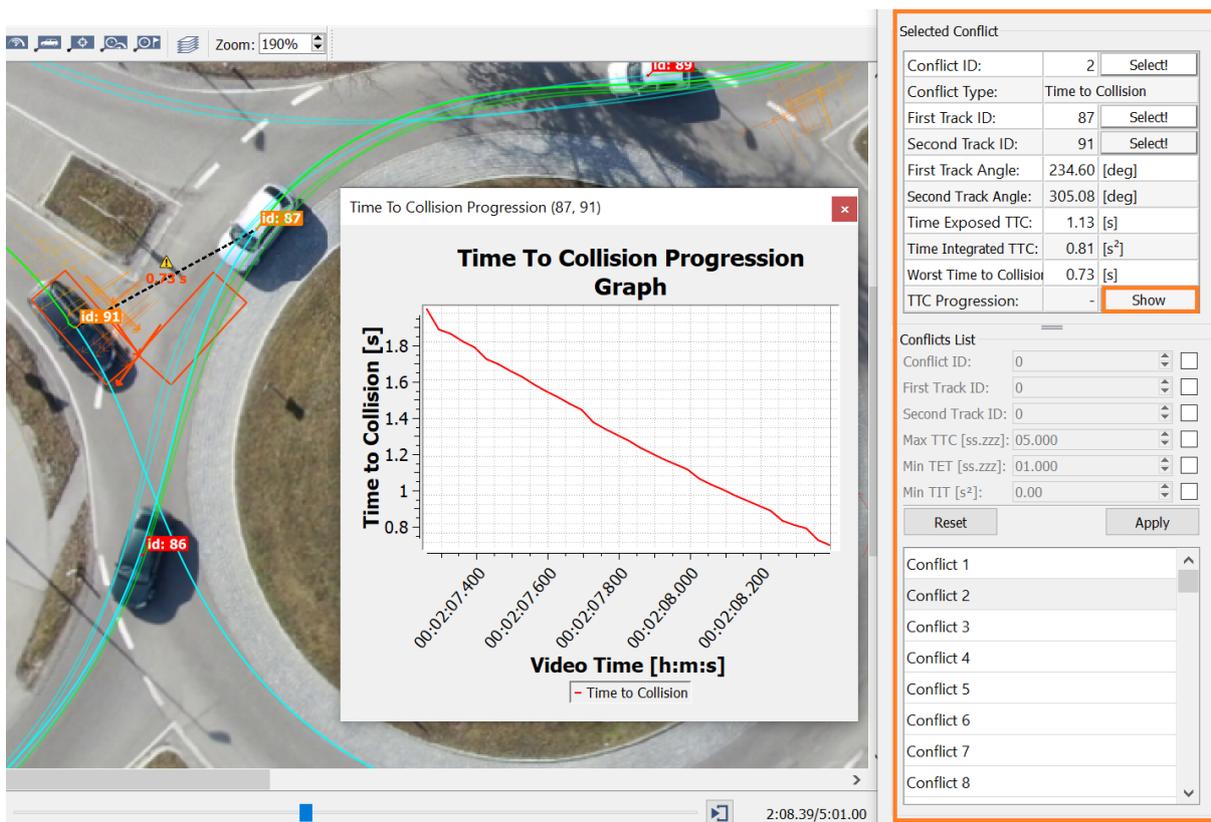
Post Encroachment Time

Post-encroachment time is used to **identify the difference between time when the first vehicle enters the conflict point until the time another vehicle arrives at this point.** In this case, you can set a Threshold Value the same way as in Time to Collision.

Heavy Braking

Another possibility of how to detect dangerous behaviour is through the **heavy braking conflict list.** Define your own deceleration for dangerous behaviour and go through the Conflict list to see and manage identified situations.

Export to .CSV File

Export .CSV file with all the data for each of safety analyses: near-by collisions, post encroachment time or heavy braking separately. Exported file will look similar for all analysis exports. This one is an example of near-by collision.

See the description of all values below:

- **Most Critical Conflict ID and Type of the Safety analysis** - Unique ID and name of conflict (Time to Collision (TTC), Post Encroachment Time (PET) and Heavy braking (HB)).

- **First Track ID and Second Track ID with First Track Type and Second Track Type** - (in case of time to collision list) - unique ID and type of both vehicles.

- **Time Exposed TTC [s] and Time Integrated TTC [s2]** - How long the threshold value was under specified value set in Time to Collision and area of the TTC that was below the threshold value.

- **Conflicts (Image ID)** - Image ID when conflict was detected.

- **x [deg] and y [deg] position** - (in case of time to collision list) - Exact position of possible conflict location at a specific frame - Conflicts (Image ID)

- **x [deg] and y [deg] position** (in case of post encroachment time and heavy braking list) - Exact position of the vehicle at a specific frame - Conflicts (Image ID)

- **First Track Angle [deg] with Second Track Angle [deg]** - Shows the angle of first and second track at the time conflict occurs.

- **Time to Collision [ms]** - (in case of time to collision list) Time to collision at that moment.

- **Post Encroachment Time [ms]** - (in case of post encroachment time list) - Time between 2 vehicles that has passed the same point.

- **Braking Time [s]** – (in case of heavy braking list) – How long the deceleration rate was higher than set value.

- **Tan. Acc. [ms-2]** – (in case of heavy breaking list) – Tangential Acceleration at a specific moment (frame of the video).

In case of **Time to collision export**: columns Conflicts (Image ID), x [deg] and y [deg] position, First Track Angle [deg] with Second Track Angle [deg] and Time to Collision [ms] are repeating for the whole duration of a conflict. Data are changing per each frame of the video. In case of **heavy braking export:** columns Conflicts (Image ID), x [deg] and y [deg] and Tan. Acc. [ms-2] are repeating for the whole duration of a conflict. Data are changing per each frame of the video.

Are you looking for more information to detect relations between objects? Check the article **How to visualize objects and their interactions?**