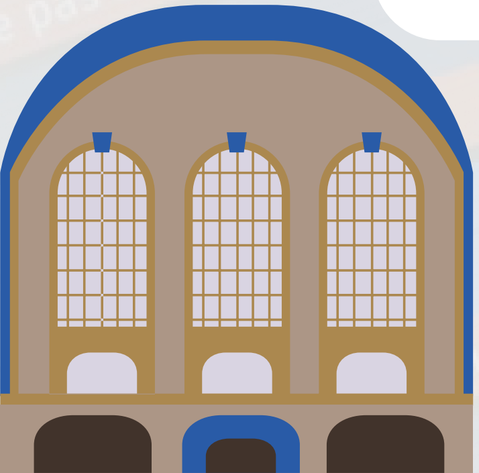
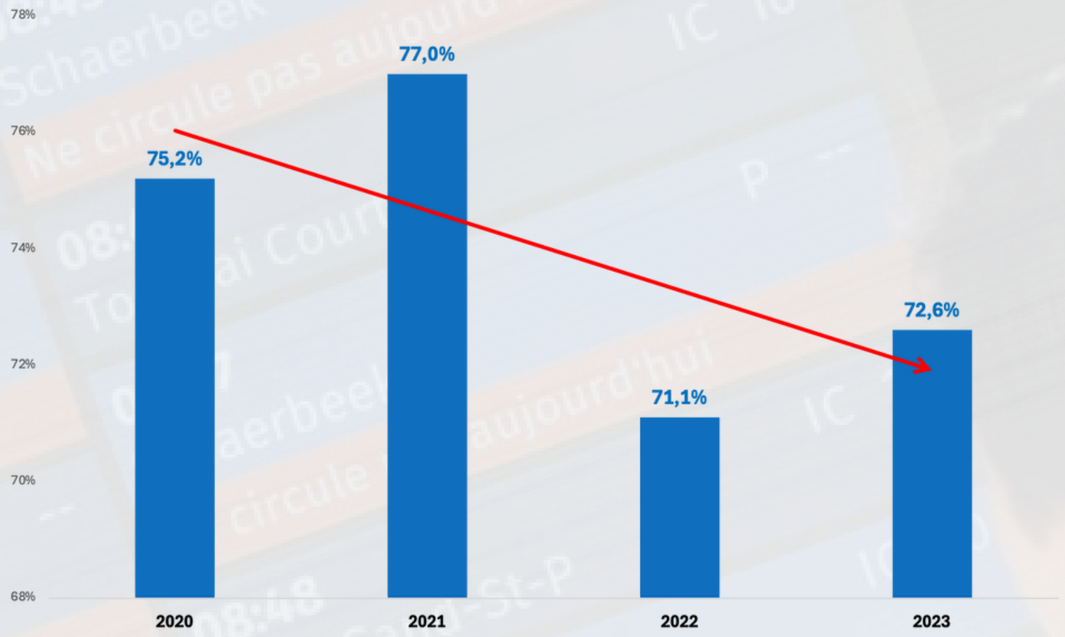
ENHANCING THE QUALITY OF TRAIN SERVICES: A DATA-DRIVEN APPROACH

Main Focus
Punctuality and reducing train cancellations

Why it matters?
Train punctuality impacts passenger satisfaction and operational efficiency



Passenger satisfaction 2020-2023 (in %)



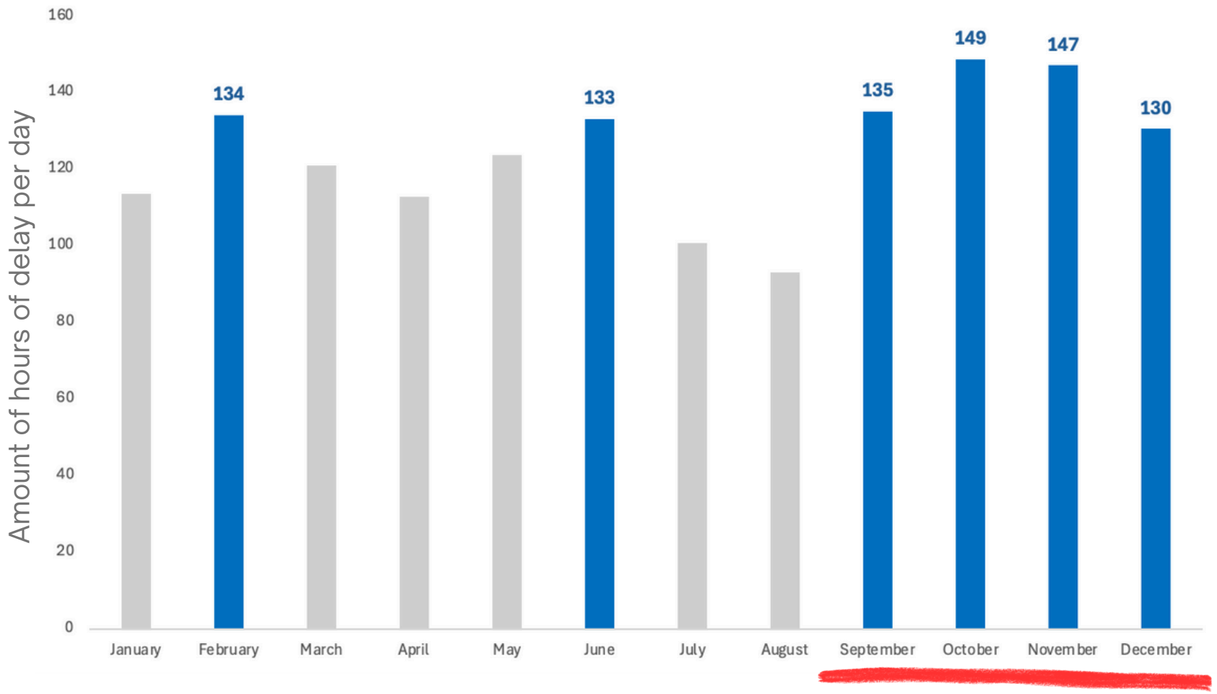
All following data is based on data from 2019-2024. However, 2020 is not taken into account since the number of trains and passengers during the COVID-19 pandemic was significantly lower and could create a distorted view.

WHEN AND WHY PUNCTUALITY DECLINES

Average punctuality per month (in %)

Punctuality **dips significantly during winter months**. It reaches its lowest point in November, slightly recovers the months of December and January.

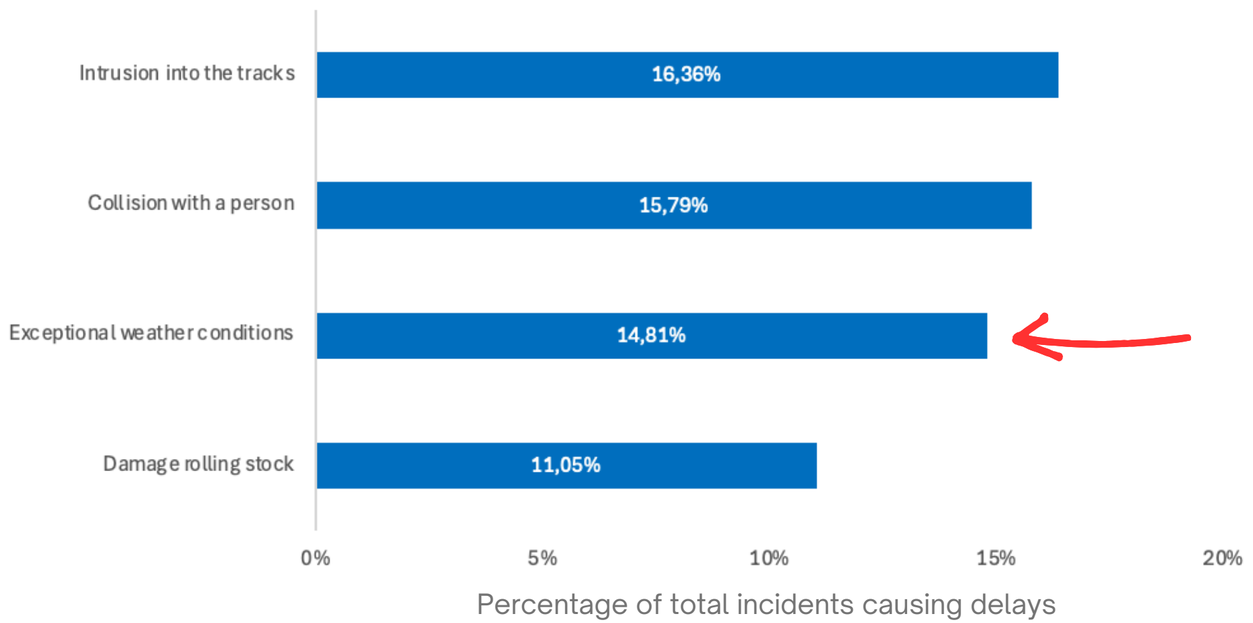
Daily hours of delay per month



A recurring pattern emerges on the graph, where delays spike during winter months, with **a maximum delay of 149 hours**. This lowers overall customer satisfaction and network reliability. What specific conditions could cause this amount of delay?

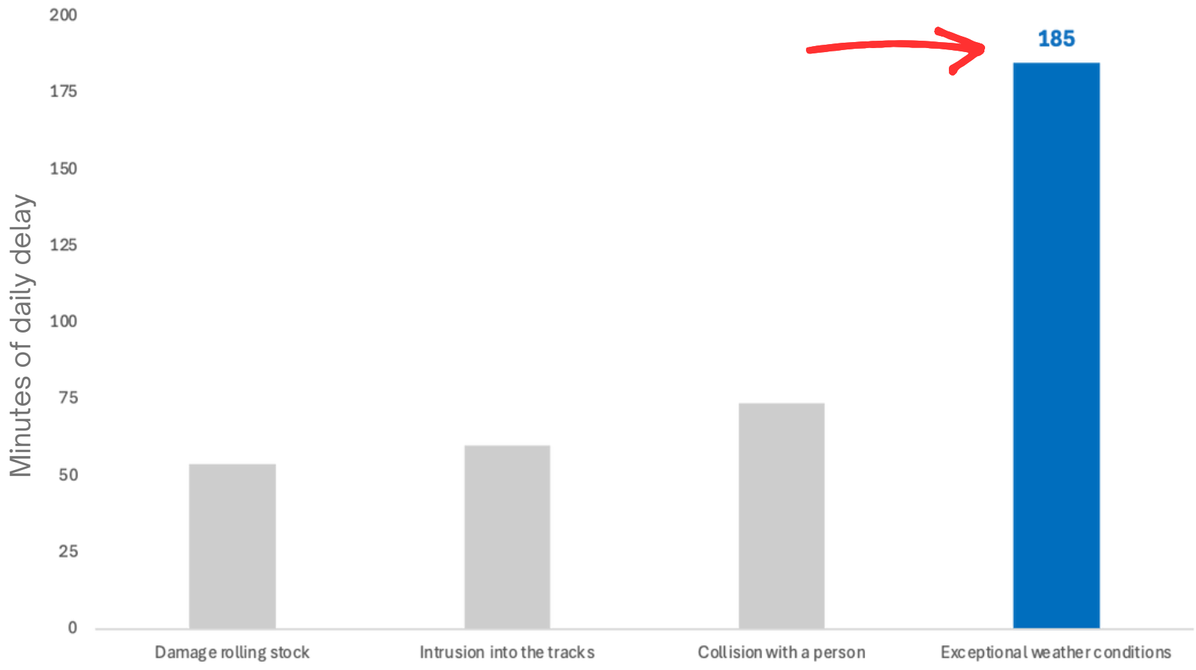
WHAT CAUSES TRAIN DELAYS?

Main incidents causing delays



The graph represents the main incidents that cause delay.
15% of delays are related to weather conditions, due to overhead lines and switches that are heavily affected by wintery conditions like snowfall or freezing temperatures.

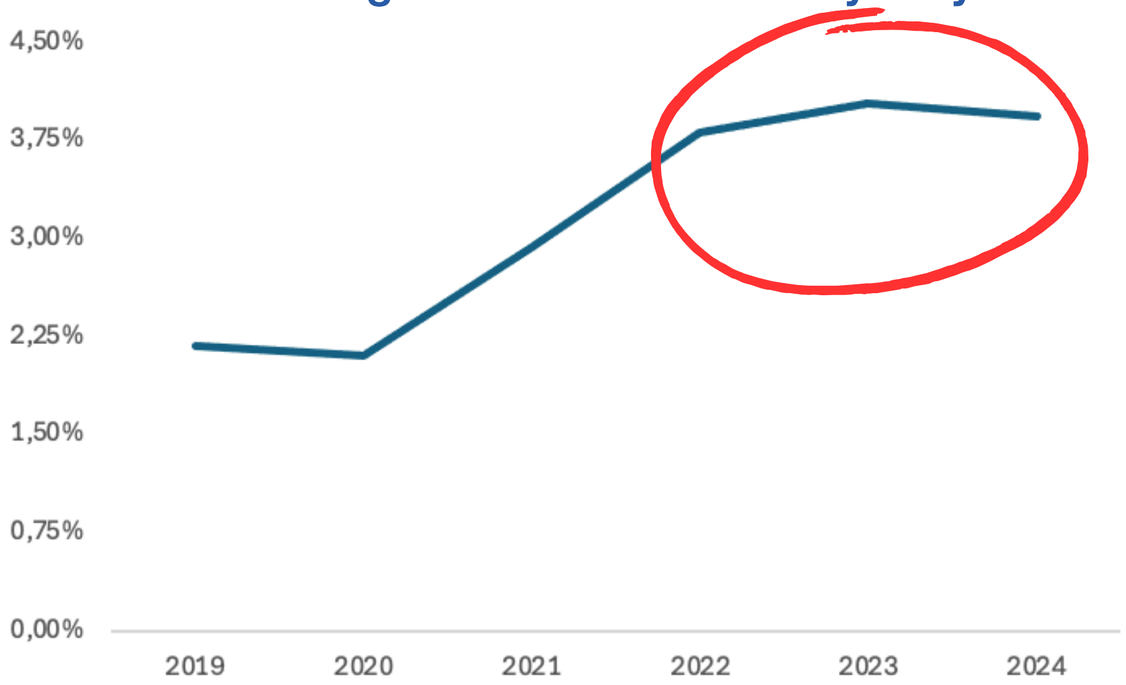
Average daily delay per incident type (in min)



The graph focuses on the daily delays of trains expressed in minutes due to various causes. **Weather conditions** significantly outclass the other causes. On average there is **a daily delay of 185 minutes**.

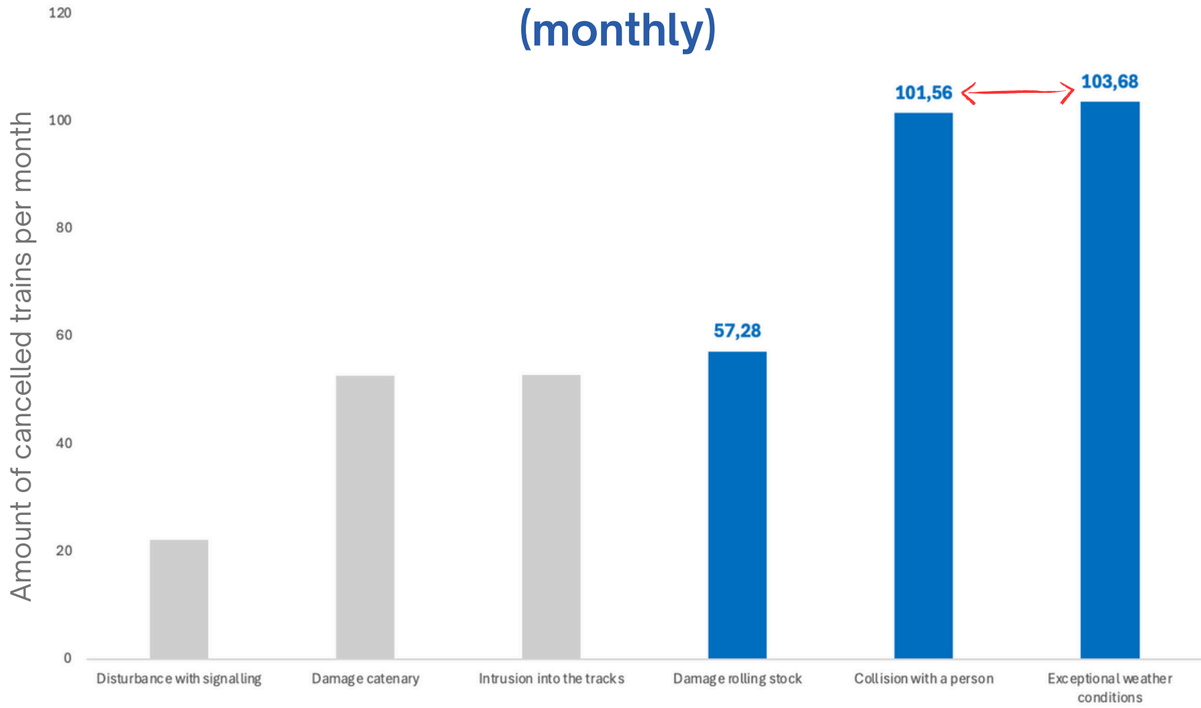
HOW MANY TRAINS ARE CANCELLED?

Percentage of trains cancelled yearly



We can clearly note a positive trend in the percentage of total trains cancelled over the years 2019 and 2024 without include 2020. There can be **an increase noted of around times 1,7** in comparison to 2019.

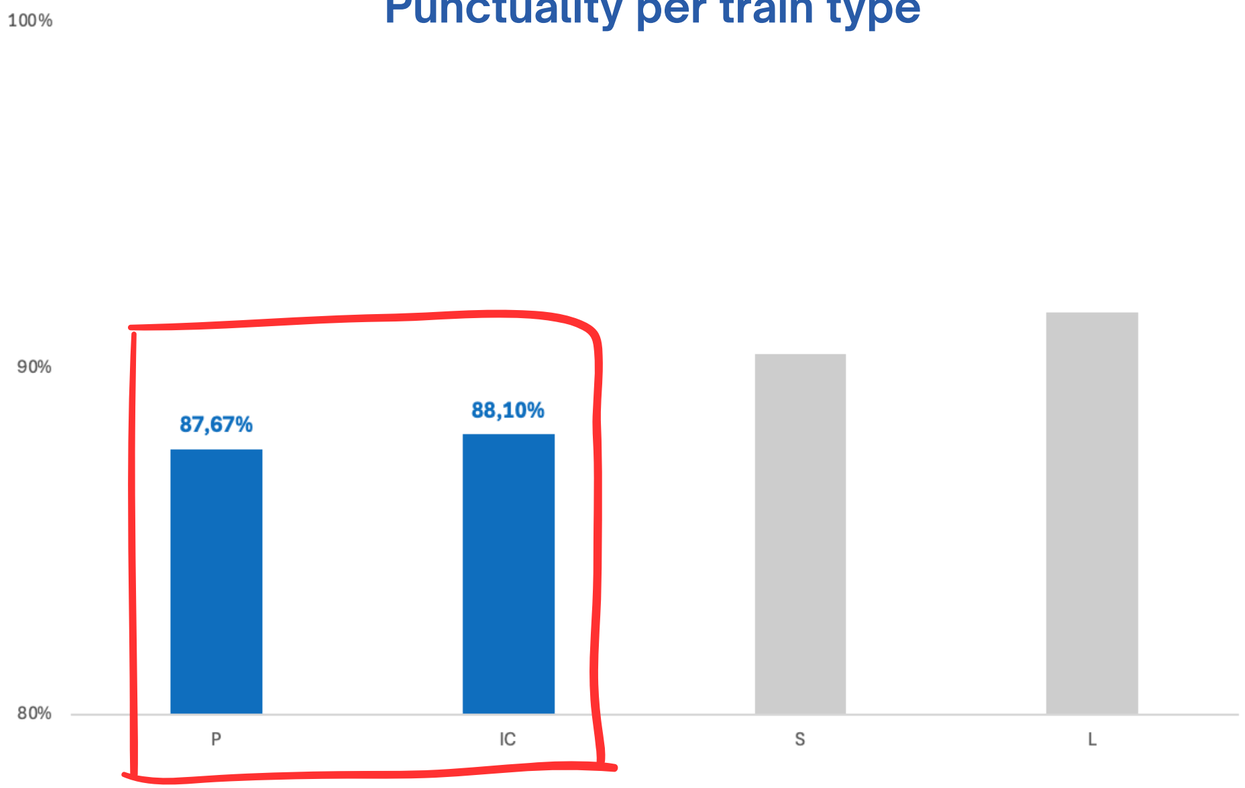
Number of trains cancelled per incident (monthly)



Examining what causes this is linked to, we notice that the same causes return namely, **exceptional weather conditions**, collisions with a person and damaged rolling stock.
Again, exceptional weather conditions represents the **highest number of in total 103 trains cancelled.**

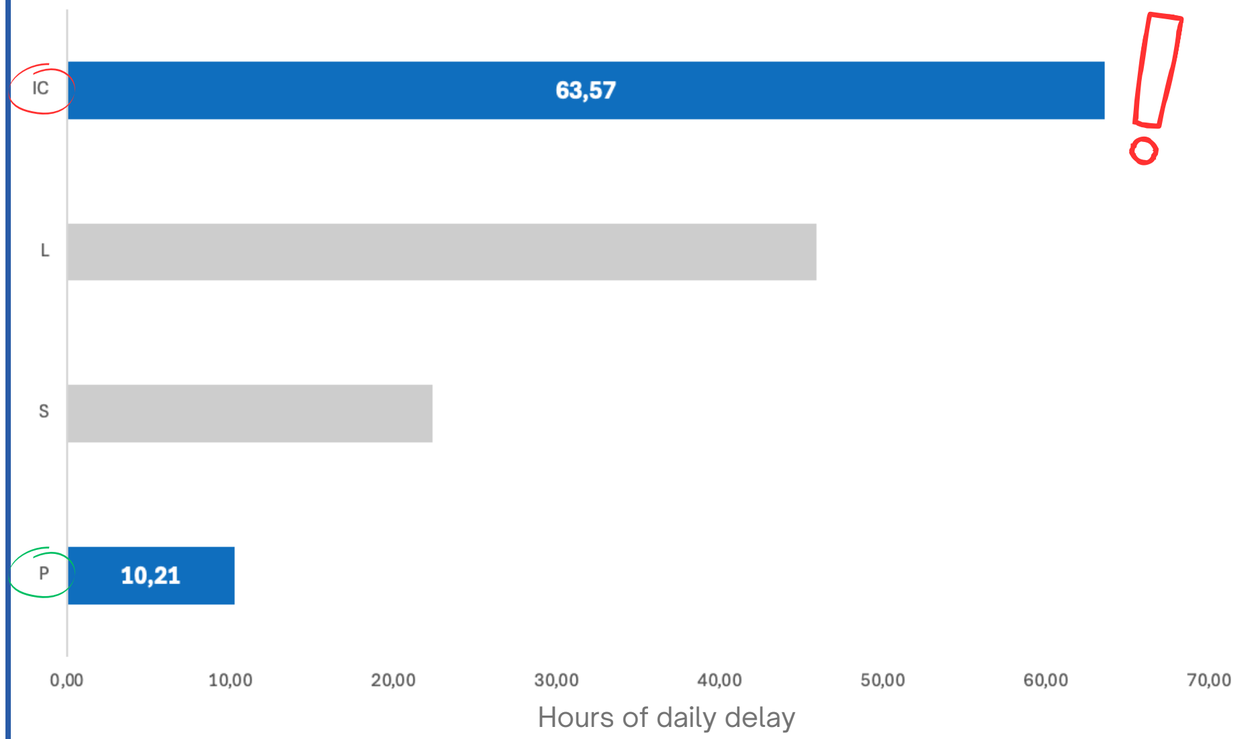
WHAT TRAIN TYPES ARE LEAST PUNCTUAL?

Punctuality per train type



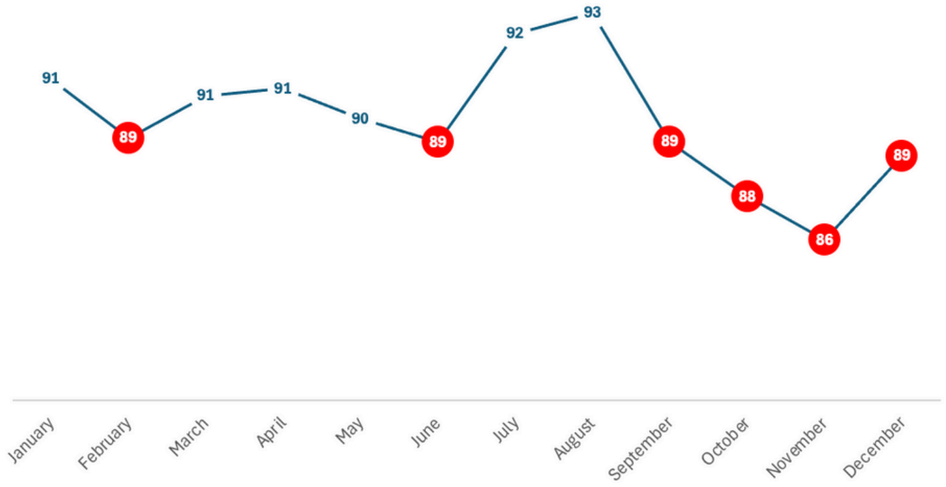
P- and IC-trains are the least punctual, with **both a punctuality of less than 90%**.
IC trains only stop at principal stations, while P trains are additional services operating during peak hours.

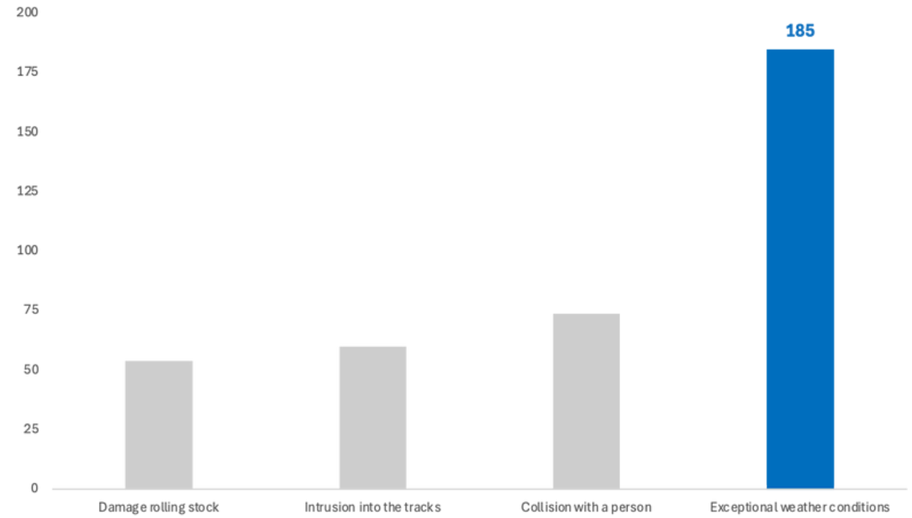
Average daily delay per train type (in hours)



However, when looking at the amount of daily delay per train type. **IC-trains cause almost 64 hours** of delay on a daily basis, while **P-trains** only cause an average of **10 hours of delay**.

CONCLUSION





In conclusion, the main focus for enhancing train services, and hence improving passenger satisfaction, should be on **train punctuality and reducing cancelled trains**.

1. For this, we know that **during the winter months, punctuality drops**. This means we need to start **preparing trains earlier for the cold** winter months. This will mainly involve **focusing on IC trains**, which cause the most delays.
2. A second improvement on train punctuality, will be to **make the environment around the tracks safer**, to reduce the number of collisions with people/intrusions into the tracks.