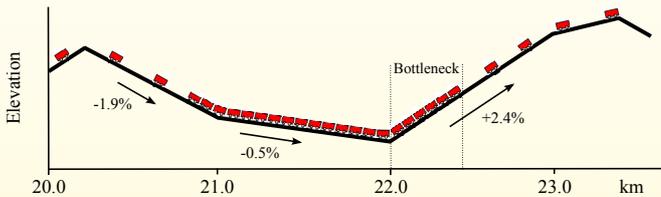


Impacts of Car-following Behaviour on Traffic Flow Capacity at Sags

Introduction

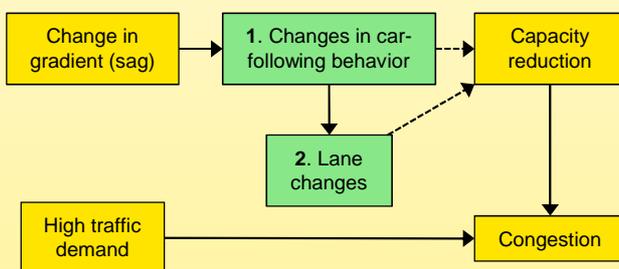
- ❖ Congestion frequently occurs at sags:



- ❖ Capacity decreases on the uphill section.
- ❖ Congestion generally forms first on the fast lane(s) and then it spreads to the slow lane(s).
- ❖ The factors triggering congestion on the fast lane(s) have not been clearly identified yet.

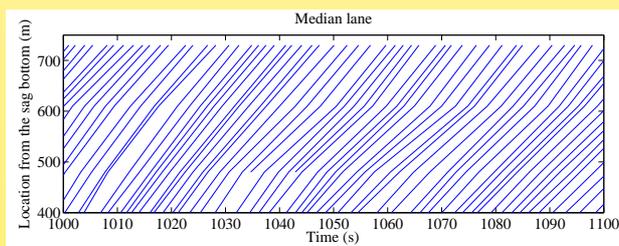
Research objective

To determine whether changes in car-following behaviour or lane changes are the main factor reducing the capacity of the fast lane(s) at sags.



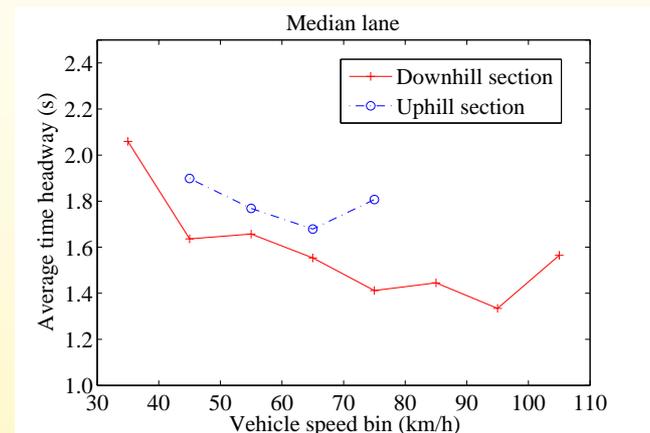
Data characteristics

2284 vehicle trajectories (including lane changes) collected by means of 10 video cameras located 120 m apart from each other along a 3-lane sag of the Tomei Expressway (near Tokyo, Japan), during the morning peak hour. Sample:

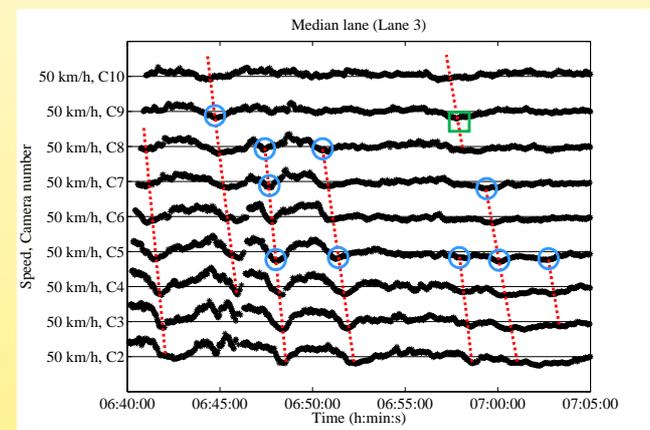


Findings

Finding 1. Drivers tend to keep longer time headways on the uphill section than on the downhill section at similar speeds:



Finding 2. Most traffic flow disturbances (89%) are triggered by car-following instabilities instead of lane changes (11%):



Speed disturbances propagating upstream
Cause of speed disturbance formation and growth: ○ Car following instabilities
□ Lane changes

Conclusions

- ❖ The results show that car-following behaviour changes on the uphill section, which reduces capacity.
- ❖ Furthermore, these changes in car-following behaviour are the dominant factor reducing the capacity of the fast lane(s) at sags. Lane changes are a less important factor.