**INTRODUCTION AND BASIC IDEAS**

Decrease of vigilance due to drowsiness affects driver behavior and results in:

- Delay in response/reaction
- Problems with vehicle control (lateral and longitudinal)
- Traffic accidents

**Vulnerable driver population:**
- young, novice drivers,
- senior drivers,
- shift workers, overtime workers.

**MEASUREMENT METHOD**

**Testing cohort**
- 12 subjects, all male
- two age groups
  - [young/novice] drivers – n=8, s=3.6, $s^2=12.98$, sd= 3.37, $sd^2=11.36$, mean = 23.87;
  - [elder/experienced] drivers – n=4, s=13.96, $s^2=194.6$, sd=12.09, $sd^2=146.19$, mean=49.75)

**Experiment setting**

**Testbed:** light half-cockpit steady based simulator – personal car Skoda Octavia II

**Scenario:**
- highway with minimum road curvature and with light/no traffic
- sleep-provoking, tedious landscape
- leading vehicle with speed-change cycles

**Measurement conditions:**
Each subject is measured in two states – rested (normal night sleep) and after limitation of sleep in last 24 hours.

**MEASUREMENT RESULTS**

<table>
<thead>
<tr>
<th>Vehicle control</th>
<th>Deviation of speed</th>
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</thead>
<tbody>
<tr>
<td>Lane position</td>
<td>Lateral position</td>
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<tr>
<td>Lane departure time</td>
<td>Lane departure area</td>
</tr>
</tbody>
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**EXAMPLES**

**Speed difference in two states of one subject**

**EVALUATION METHOD**

**CONCLUSIONS AND SOME OTHER FINDINGS**

Increase in lane departure time and area is a characteristic measure for all categories of subjects.

Change in speed variation differs between groups:

- Increase in speed variation in experienced subgroup is explained by higher headway gaps
- Decrease of speed variation in novice subgroup was caused by keeping dangerous (short) headways.

Each age group included: 1 shift worker, 1 long-distance driver and a driver with experience of accident due their falling asleep at wheel. 50% of all subjects admitted they are not sleeping enough, 17 subjects were invited for experiment, 5 couldn’t participate in measurement because of simulator sickness.