



**busworld**<sup>®</sup>  
academy

KNOWLEDGE PLATFORM  
FOR THE WORLDWIDE  
BUS & COACH SECTOR

# How to keep the drivers alert on the road?

Jelle Van Winckel, CEO, DTS





# STAY ALERT !

---

**Jelle Van Winckel**  
**Driver attention expert**

# Feeling sleepy?





# Drowsiness test

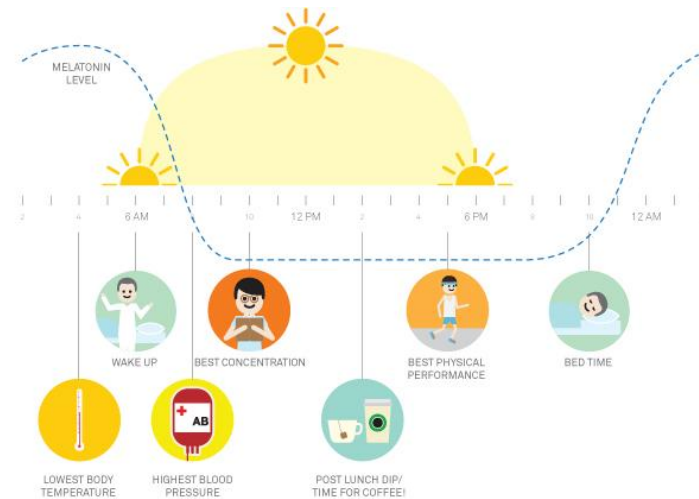
- When I'm drowsy all I need is caffeine to wake me up?  
**FALSE**
- I can tell when I'm about to fall asleep  
**FALSE**
- I don't need much sleep  
**FALSE**
- Young people need less sleep  
**FALSE**
- Alcohol can make u sleepy  
**TRUE**

# What causes drowsiness

## Sleep loss



## Circadian rhythms

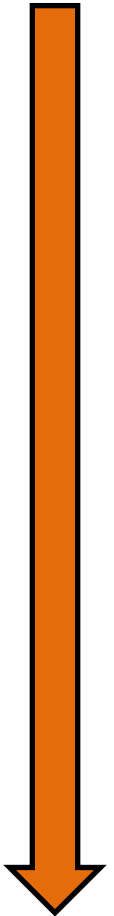


## Time spent driving/working



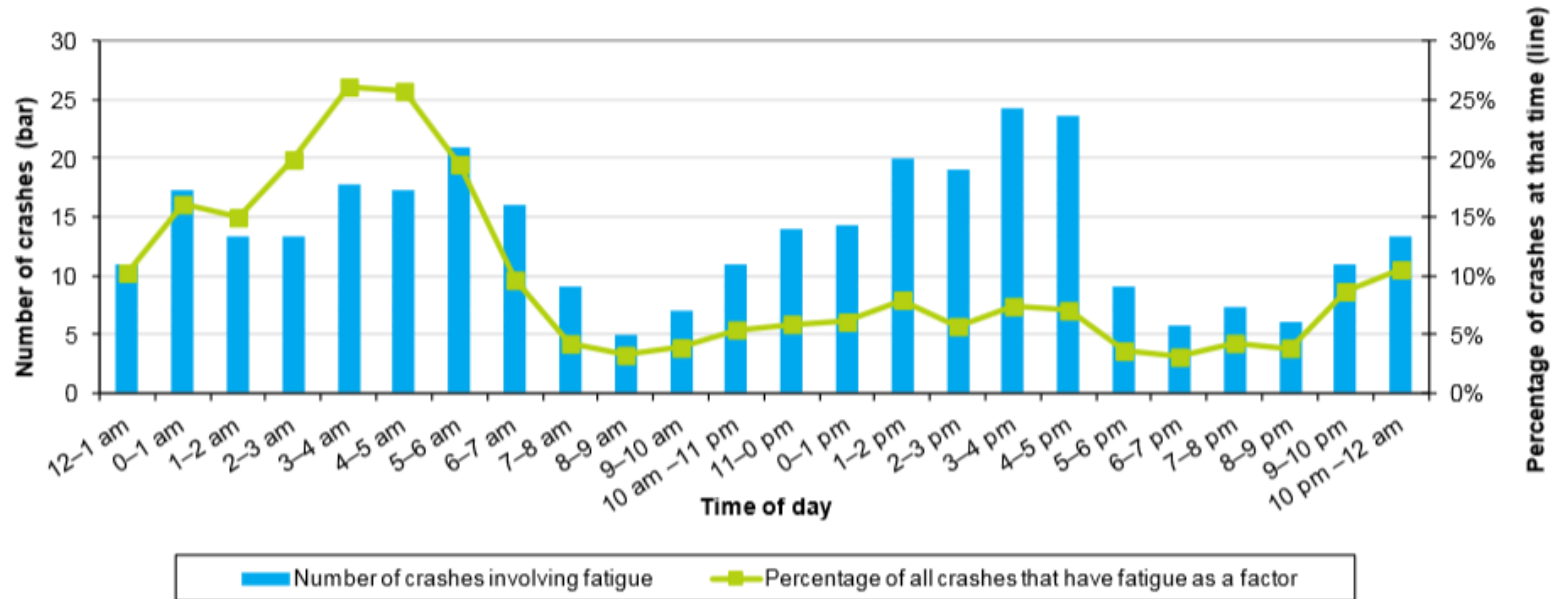
# The signs

- Your thoughts wander
- You feel impatient, in a hurry and grouchy
- You cant remember driving the last few miles
- Dry eyes
- Less steering, slower reactions
- More yawning
- More eye blinking
- You drift into other lanes
- You feel your head nodding











































# The characteristics

- **Highest risk between 2AM and 4AM**
- Or **after lunch (14PM)**
- **Professional drivers** have higher risk
- **Men between 18-29** highest risk
- **39 lapses** of microsleep **each hour**, on average **3.4s per lapse**
- **Monotonous activities**
- **Deadly** results due to **no braking** just before the crash
- **No test** to check the impairment of the driver (ref. Alcholotester)



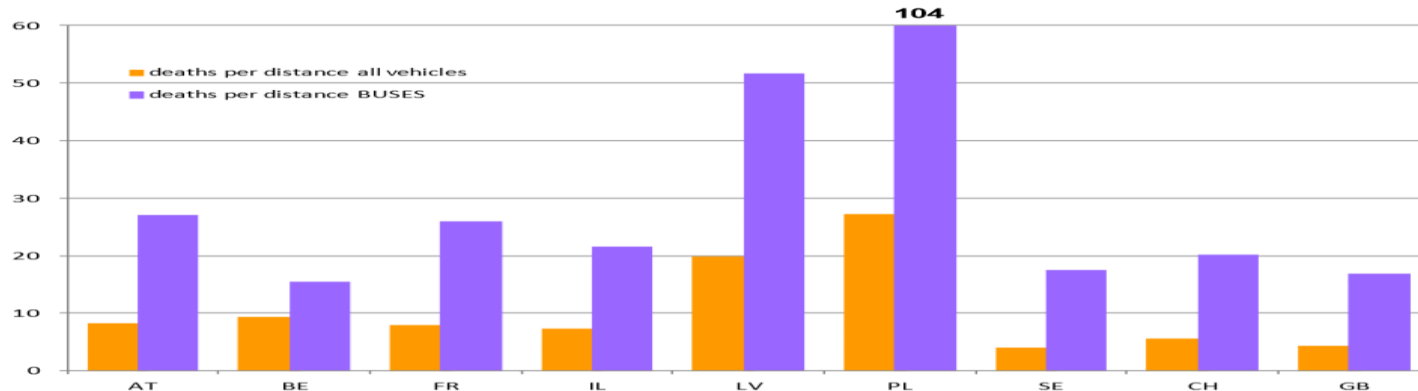


# The results

-  January 3 — At least 7 people died when three cars collided in Yaroslavl Oblast.<sup>[187]</sup>
-  January 3 — At least 5 people were killed and 2 injured when two vehicles collided in Saratov Oblast. In another accident a passenger bus and a car collided in Leningrad Oblast, killing at least 4 people.<sup>[188]</sup>
-  January 5 — At least 11 killed, including 4 children and 33 injured in bus accident in Colombia.<sup>[189]</sup>
-  January 10 — At least 25 people, including 11 children, were been killed when the truck they were travelling in overturned in the eastern Indian state of Bihar.<sup>[190]</sup>
-  January 12 — At least 29 people killed after a bus veered off a mountain road and crashed in Nepal.<sup>[191]</sup>
-  January 18 — At least 4 people were killed and 16 injured when a bus and a truck collided in Lviv Oblast.<sup>[192]</sup>
-  January 18 — At least 6 were killed and 2 injured in car crash in Volgograd Oblast.<sup>[193]</sup>
-  January 21 — At least 14 people were killed and 13 injured in a car accident in Asyut Governorate.<sup>[194]</sup>
-  January 21 — At least 24 people were killed and 7 injured in road accident.<sup>[195]</sup>
-  January 21 — At least 18 were killed and 24 injured when a bus fell off the road and plunged 300 meters into a ravine in Bolivia.<sup>[196]</sup>
-  January 23 — At least 14 people were killed and 33 injured when a bus fell into a 36-meter-deep ravine.<sup>[197]</sup>
-  January 23 — A double-decker bus fell off a cliff several meters and killed 25 people and injured 35 others.<sup>[198]</sup>
-  January 24 — The collision of two passenger buses in the Santa Cruz de la Sierra region killing 20 people and injuring 54.<sup>[199]</sup>
-  January 27 — 11 were killed and another 30 injured in bus accident in Sertã.<sup>[200]</sup>
-  January 31 — At least 3 people, including 2 children die after a 30 car collision in Detroit.<sup>[201]</sup>
-  February 3 — At least 7 were killed and 28 injured in bus accident in South Sinai Governorate.<sup>[202]</sup>
-  February 4 — At least 8 were people killed in bus accident in California.<sup>[203]</sup>
-  February 4 — At least 22 were killed and 24 injured when a bus collided with a truck in United Arab Emirates.<sup>[204]</sup>
-  February 7 — At least 53 people were killed when a bus collided with a truck in Chibombo District.<sup>[205]</sup>  
*Main article: Chibombo bus crash*
-  February 9 — The fall of a passenger bus off a cliff in the city of Tome left 15 dead and 19 injured.<sup>[206]</sup>
-  February 11 - At least 16 people were killed and 15 injured in bus accident in Dhaka.<sup>[207]</sup>
-  February 12 — At least 10 people were killed when a truck collided with three cars in Alexandria.<sup>[208]</sup>
-  February 14 — At least 18 were killed and 23 injured in a collision between two buses.<sup>[209][210]</sup>
-  February 27 — At least 35 people were killed and 50 injured in bus accident in Kenya.<sup>[211]</sup>
-  February 28 — At least 6 people were killed in a bus accident in Siantar, Indonesia.<sup>[212]</sup>
-  March 4 — At least 11 children and a driver were killed and another 10 children injured when a school bus collided with a truck in state of Punjab, India.<sup>[213]</sup>
-  March 8 — At least 11 people were killed and 48 injured in a collision between two buses.<sup>[214]</sup>
-  March 10 — At least 14 were people were killed and 30 injured in a bus accident.<sup>[215]</sup>
-  March 10 — At least 6 teenagers were killed and 2 others injured in car accident in Ohio.<sup>[216]</sup>
-  March 15 — At least 8 Syrians were killed and 30 others injured in a bus accident in the town of Kahale.<sup>[217]</sup>
-  March 15 — At least 24 people were killed and more than 40 injured in bus accident.<sup>[218]</sup>
-  March 16 — At least 24 soldiers were killed and 5 wounded in road accident in Kohistan District, Pakistan.<sup>[219]</sup>
-  March 16 — At least 14 Palestinians and a driver were killed and 5 wounded in a collision between a bus and a truck.<sup>[220]</sup>
-  March 16 — At least 12 people were killed and another 26 injured in a bus accident.<sup>[221]</sup>
-  March 19 — At least 37 people were killed and 14 injured after a bus fell off a bridge in state of Maharashtra.<sup>[222]</sup>
-  March 23 — At least 25 people were killed in a collision between a bus and another vehicle in Punjab, Pakistan.<sup>[223]</sup>
-  March 23 — At least 2 people were killed and another 7 injured in minibus accident in Egypt.<sup>[224]</sup>
-  March 26 — At least 7 people were killed in a collision between a bus and a trailer in Punjab, Pakistan.<sup>[225]</sup>
-  March 27 — At least 12 people were killed in a bus accident in Punjab, Pakistan.<sup>[226]</sup>
-  March 28 — At least 6 people were killed and another 18 injured in a collision between a bus and a truck in Vologda Oblast.<sup>[227]</sup>

# The results: statistics

- **5000 people died in HGV accidents in 2011 in EU**
- **30% of accidents with HGV due to drowsiness and fatigue**
- **NHTSA estimates \$12.5 billion in crash costs**
- **231.000 killed in road traffic crashes in India every year**
- **Average crash cost of 142.000 euro in EU (without injuries)**
- **With injuries on average 289.000 euro**
- **With fatalities on average 5.2 million euro**



# The counter-measures

Behavioral measures

Government/public

In vehicle warning systems

# Behavioral

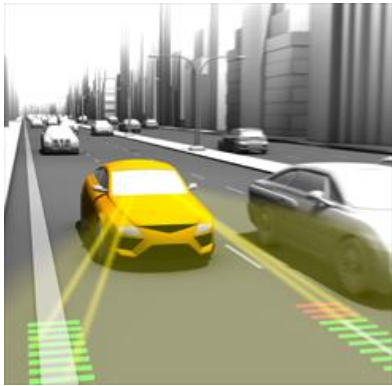
- Prepare your long-haul trips
  - ✓ adequate sleep
  - ✓ avoid alcohol or medication
  - ✓ schedule breaks
- Caffeinated beverages
- Share the drive

# Government/public

- Legislation
- Awareness campaigns
- Infrastructure
- Better reporting practices

# In-vehicle warning systems

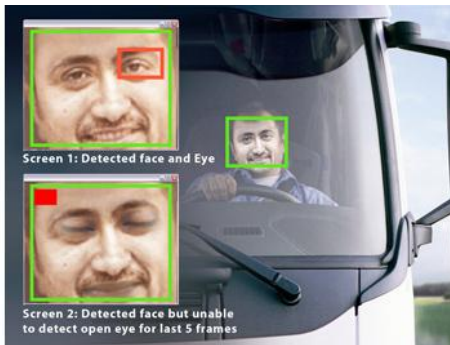
## Lane departure



## Steering behaviour



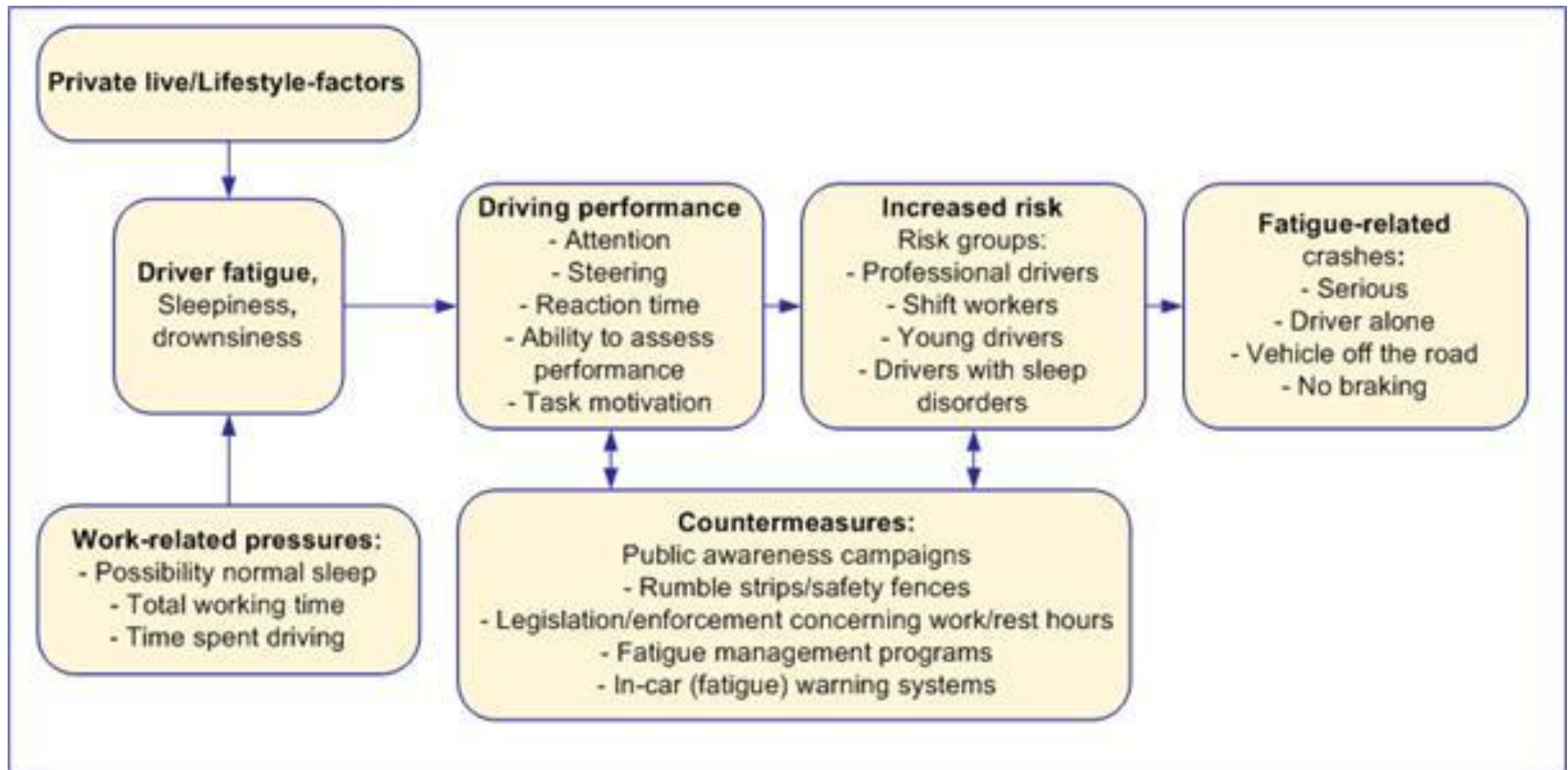
## Face recognition



## Parameter based



# Summary



# Ario



THANK YOU  
Questions?



[www.d-ts.be](http://www.d-ts.be)