

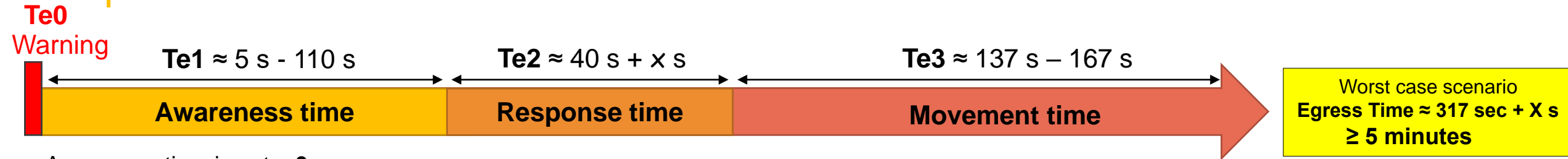


Considerations on egress time

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*3rd SIG TP meeting, March 12-14, 2024
Aachen, Germany*

Egress Time assessment



Awareness time is not « 0 s », we are not robots

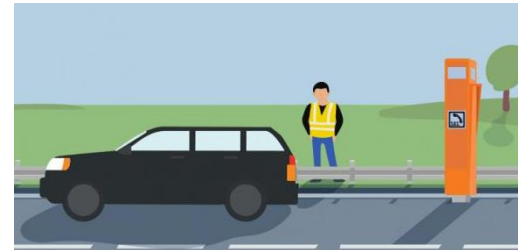


- Experiments and simulations indicate that **awareness time is highly individual and can be up to ~ 110 s** [1-4]

People remain inside a car even when smoke/fire emanates from the vehicle (next slide)



- Deceleration ~ 40 s
- Finding a safe place can be difficult, especially during rush hour ~ $x \text{ s}$?
- Stop the vehicle ~ $x \text{ s}$?



- Evacuate the other passengers ~ [111 s – 137 s] [5]
- Retrieve the warning triangle and the reflective waistcoat ~ [30 s – 90 s] [6, 7]
- On the *25 de Abril* bridge in Lisbon, Portugal: '*Remain inside your vehicle and never abandon it.*' ~ $x \text{ s}$? [8]

- Effect of tunnel technological systems on evacuation time, Pavel Přibyl et al, Tunnelling and Underground Space Technology, 2014
- SFPE Handbook of Fire Protection Engineering, Philip J. DiNenno et al, 2002
- Evacuation experiment in a road tunnel: A study of human behaviour and technical installations, Daniel Nilsson et al, Fire Safety Journal, 2009
- Simulation of Evacuation in a Twin Bore Tunnel: Analysis of Evacuation Time and Egress Selection Nan Mu et al, Procedia Engineering, 2014
- SIGTP-02-16_(PFA)Egress Time French Process
- Input from Centro Zaragoza for Vehicle Research

- Convention on Road Signs and Signals, of 8 November 1968
- <https://www.lusoponte.pt/en/25-de-abril/road-safety>

Driver behavior when driving with a potential failure in the vehicle

- from NHTSA investigations

Examples of people who remain inside the vehicle when smoke or fire is detected in their vehicle

March 26, 2019 NHTSA ID NUMBER: 11191530 ⊖

Components: UNKNOWN OR OTHER

NHTSA ID Number: 11191530

Incident Date March 25, 2019

Consumer Location CINCINNATI, OH

Vehicle Identification Number KNDCC3LC6H5****

Summary of Complaint

| | | |
|----------|-----|--|
| CRASH | No | <p>MY 2017 KIA NIRO CAUGHT ON FIRE YESTERDAY AFTERNOON AS I WAS DRIVING DOWN THE INTERSTATE. NO COLLUSION WAS INVOLVED. I GOT A WARNING MESSAGE TO STOP THE ENGINE DUE TO A PROBLEM BEING DETECTED IN THE HYBRID SYSTEM. I PULLED OFF OF THE INTERSTATE DURING RUSH HOUR TRAFFIC AND NOTICED BLACK SMOKE COMING FROM UNDERNEATH MY HOOD. I THOUGHT THAT SOMETHING HAD JUST HAPPENED TO THE ENGINE. I STAYED IN THE CAR AND CALLED A TOW TRUCK AS I DID NOT WANT TO STAND ON THE SHOULDER OF THIS BUSY HIGHWAY. A MAN THEN JUMPS OUT OF HIS TRUCK AND STARTS RUNNING TOWARD ME YELLING AT ME TO GET OUT OF THE CAR THAT IT WAS ON FIRE. I GOT OUT, WE RAN DOWN THE SHOULDER AND WE STOOD WATCHING MY CAR BECOME ENGLUFED IN FLAMES. I JUST BOUGHT THE CAR IN NOVEMBER 2018.</p> |
| FIRE | Yes | |
| INJURIES | 0 | |
| DEATHS | 0 | |

1 Affected Product ▾

Vehicle

| MAKE | MODEL | YEAR |
|------|-------------|------|
| KIA | NIRO HYBRID | 2017 |

May 5, 2017 NHTSA ID NUMBER: 10983627 ⊖

Components: ELECTRICAL SYSTEM, UNKNOWN OR OTHER, ENGINE

NHTSA ID Number: 10983627

Incident Date April 10, 2017

Consumer Location MERRITT ISLAND, FL

Vehicle Identification Number 5TDJKRFH4FS****

Summary of Complaint

| | | |
|----------|-----|--|
| CRASH | No | <p>I WAS DRIVING 80 MPH ON THE INTERSTATE WHEN THE ENGINE LIGHT CAME ON AND A "CHECK AWD" DISPLAY APPEARED. AT THAT SAME MOMENT I LOST THE ABILITY TO STEER AND TO ACCELERATE. I MANAGED TO GET THE CAR OFF OF THE INTERSTATE. THE CAR CAME TO A STOP. I DID NOT SEE ANY SMOKE, OR SMELL ANYTHING AND THE ENGINE TEMP GAUGE SHOWED MID COOL SO I DECIDED TO START THE CAR AGAIN. WHEN I TRIED TO START THE CAR, THE ENGINE LIGHT AND THE "CHECK AWD" DISPLAY CAME ON AGAIN, AND THEN SECONDS LATER A TEMPERATURE LIGHT CAME ON WITH A LOUD ALARM. SMOKE STARTED COMING OUT OF THE FRONT LEFT HOOD. I SHOUTED FOR MY DAUGHTER AND HER FRIEND TO GET OUT OF THE VEHICLE. I GRABBED MY PHONE AND RAN TO HER DOOR TO HELP HER AND HER FRIEND GET OUT. BY THE TIME WE WERE RUNNING AWAY, FLAMES WERE COMING OUT OF THE HOOD. WITHIN MINUTES MY CAR WAS COMPLETELY ENGLUFED IN FLAMES.</p> |
| FIRE | Yes | |
| INJURIES | 0 | |
| DEATHS | 0 | |

1 Affected Product ▾

Vehicle

| MAKE | MODEL | YEAR |
|--------|------------|------|
| TOYOTA | HIGHLANDER | 2015 |

September 30, 2018 NHTSA ID NUMBER: 11132366 ⊖

Components: UNKNOWN OR OTHER

NHTSA ID Number: 11132366

Incident Date September 30, 2018

Consumer Location BROWNSBURG, IN

Vehicle Identification Number KNAGM4AD4D5****

Summary of Complaint

| | | |
|----------|-----|--|
| CRASH | No | <p>WHILE I WAS DRIVING MY 2013 KIA OPTIMA HYBRID THIS MORNING. WHILE DRIVING, I SUDDENLY GOT A WARNING MESSAGE THAT SAID "HYBRID SYSTEM FAILURE STOP SAFELY DO NOT DRIVE". I PULLED OVER AND SMELLED WHAT SEEMED TO BE FIRE, BUT SAW NOTHING. I CALLED MY FIANC TO LET HIM KNOW WHAT WAS GOING ON AND THE CABIN STARTED FILLING WITH SMOKE. I JUMPED OUT OF THE CAR AND POPPED THE TRUNK. THERE WERE FLAMES SHOOTING OUT OF THE HYBRID SYSTEM. THE FIRE WAS EXTINGUISHED, THE CAR IS NOW SITTING IN A TOW YARD. I TAKE VERY GOOD CARE OF MY CAR. THERE IS NOTHING THAT I WOULD HAVE DONE OR COULD HAVE DONE TO CAUSE THIS.</p> |
| FIRE | Yes | |
| INJURIES | 0 | |
| DEATHS | 0 | |

1 Affected Product ▾

Vehicle

| MAKE | MODEL | YEAR |
|------|---------------|------|
| KIA | OPTIMA HYBRID | 2013 |

Thank you



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