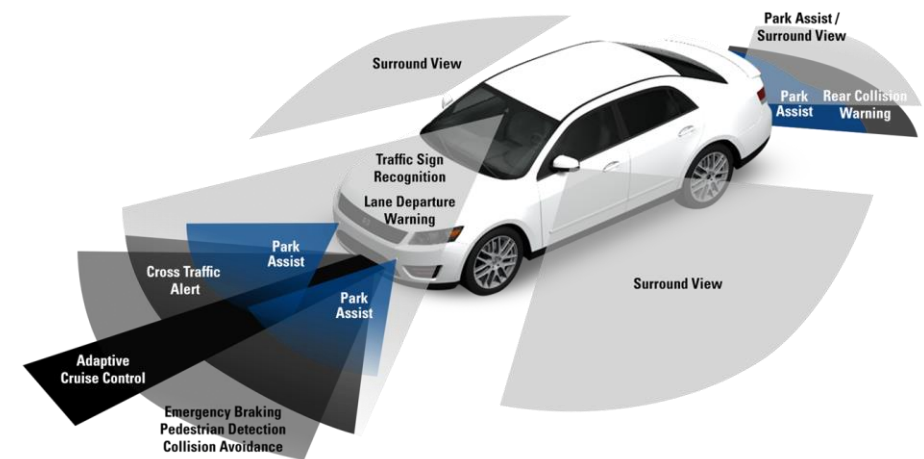




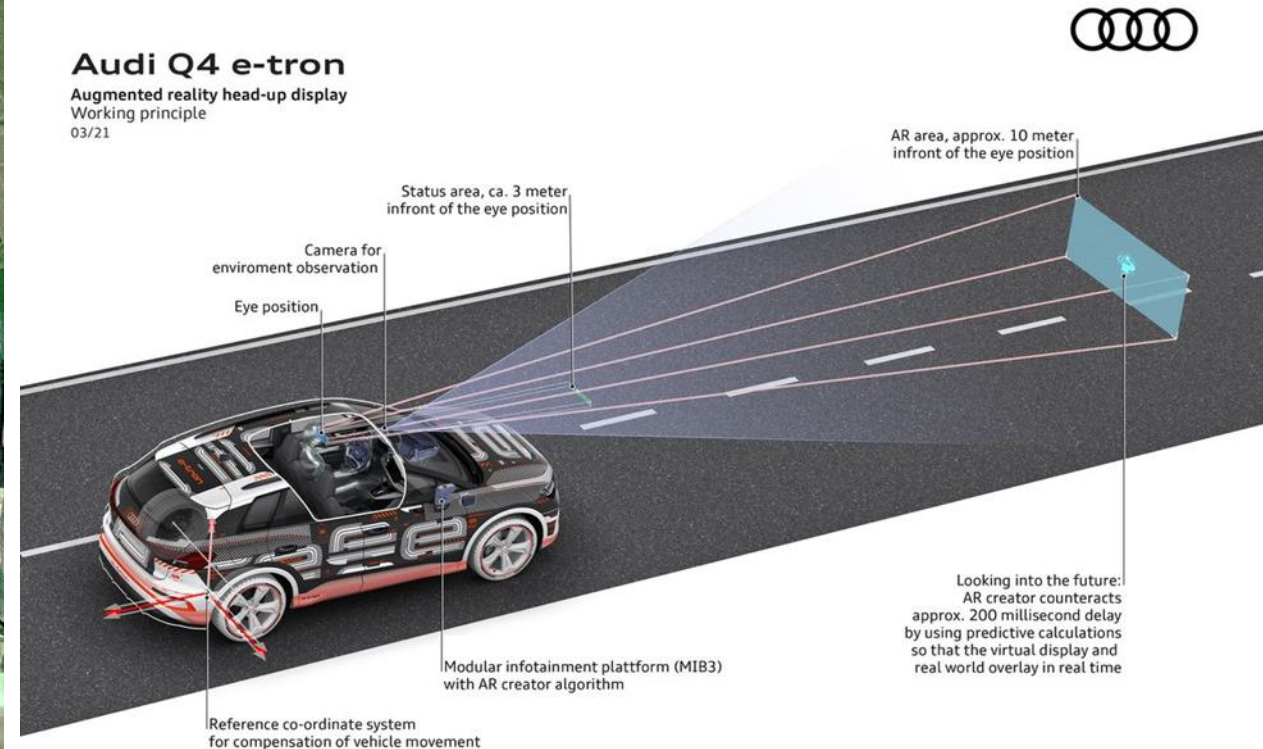
As we know, many vehicles are full of technology to protect drivers and pedestrians ...



This technology is creating complexities in vehicle glass service for consumers and service providers



At least 10 sensors between grille and windshield

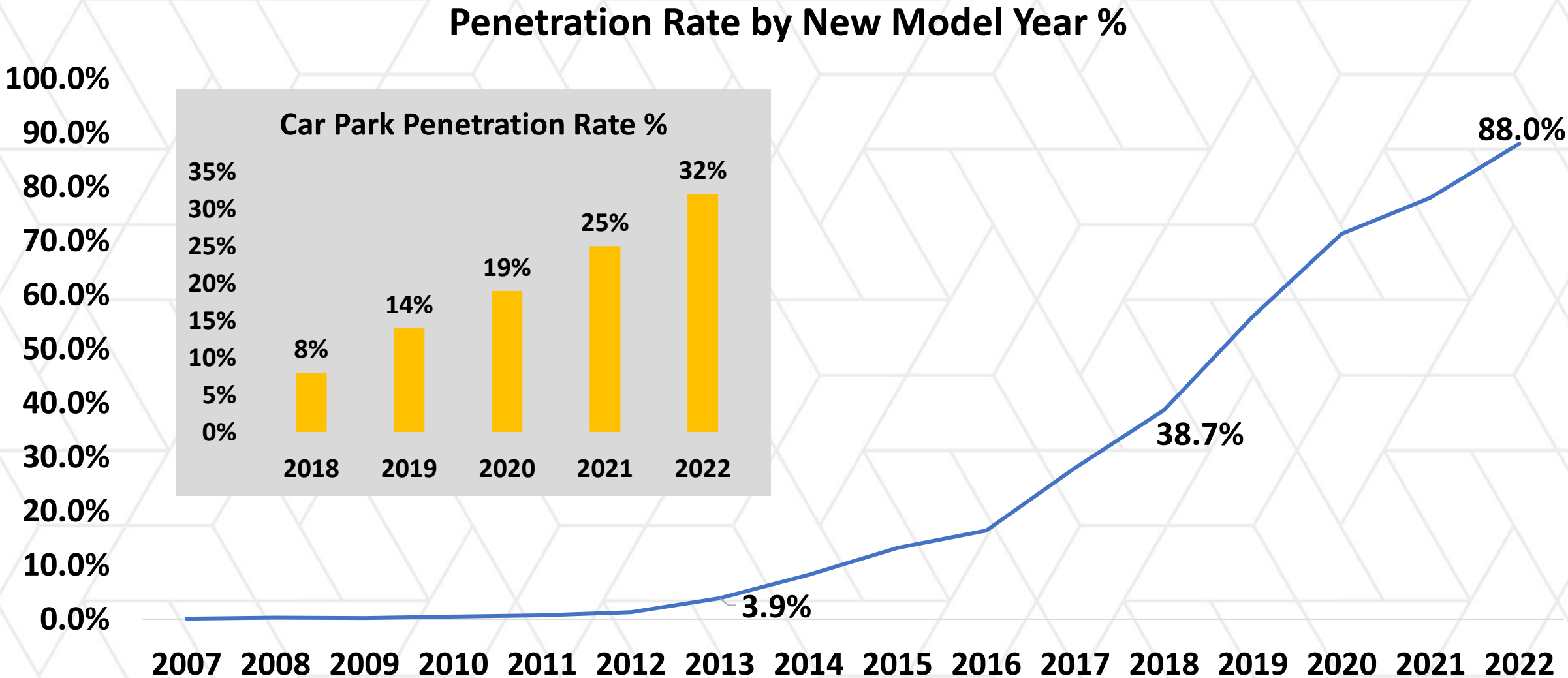


Networked sensor systems

Growth in Front Camera Penetration Rate will continue

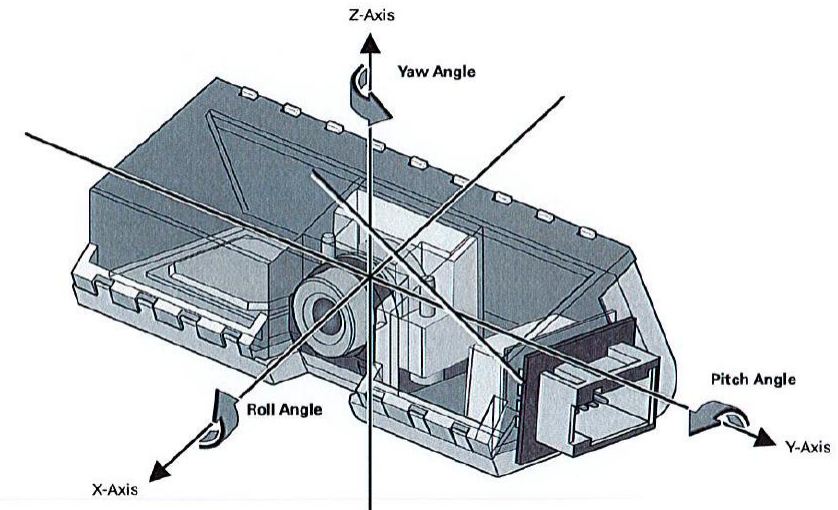
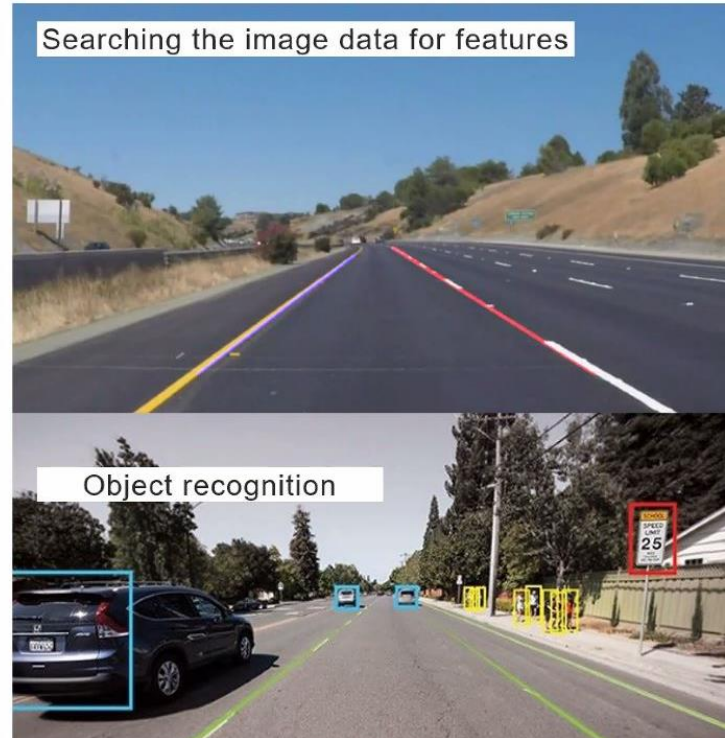
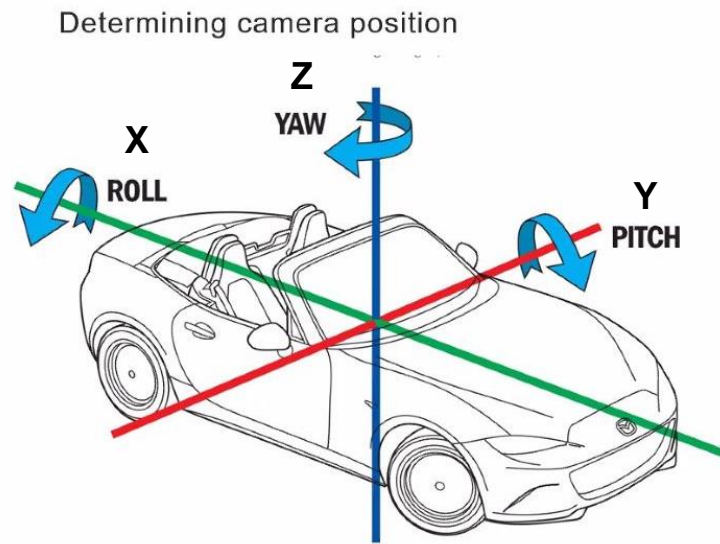
From non-existent to over >30% of carpark in a few short years

Model year 2022 vehicles close to 90% penetration rate





What is Recalibration and why is it required?



- When the windshield is replaced, the camera sensor attached to the glass is moved
- Camera does not know its position in space – its ability to recognize objects and distance is impacted
- Recalibration enables the vehicle's systems to again determine the orientation angles of the camera

Recalibration process: Static, dynamic or dual

Static process

- Uses target board(s) within **controlled environment (i.e., inside)**; geographic elements aligned at precise distance
- Onboard software uses image coordinates and reference position of board to determine correct camera orientation



Dynamic process

- Requires driving the vehicle to recalibrate
- Usually, several miles of well marked roads above 40 mph with onboard software to determine actual orientation of camera angle plus camera height



Dual process

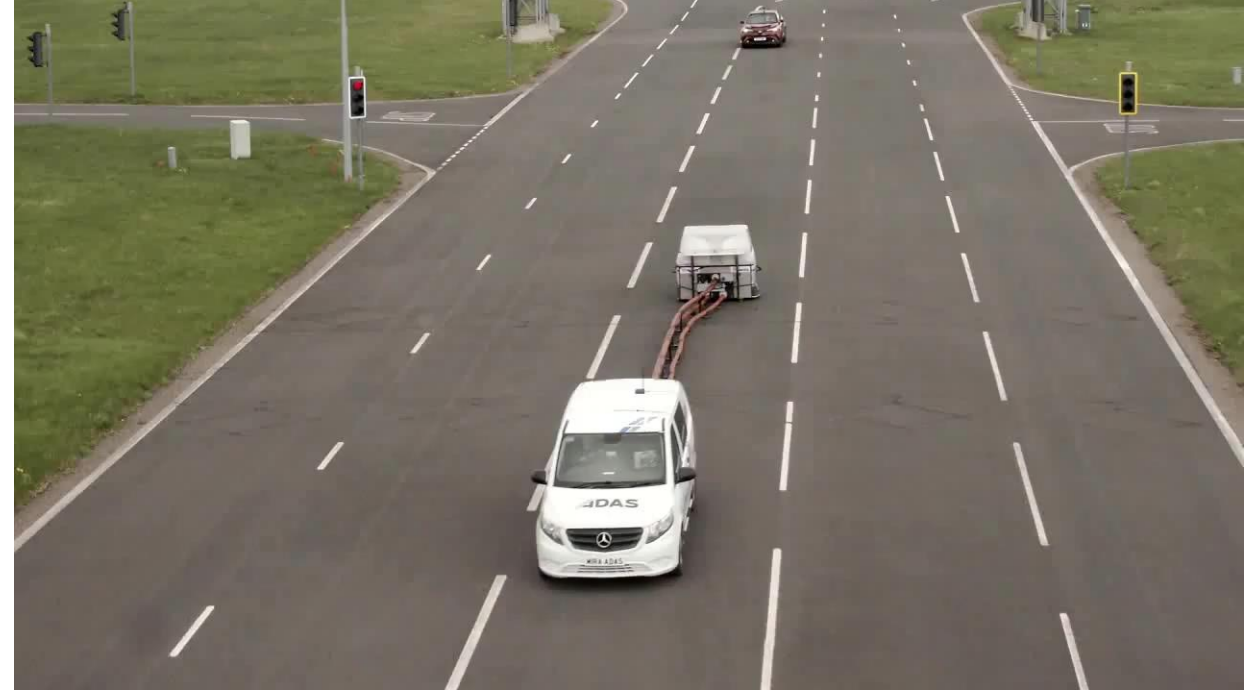
- Requires both Dynamic and Static processes
- Static process completed first and then Dynamic

THE IMPORTANCE OF A QUALITY RECALIBRATION

Auto Emergency Braking



Excerpt from a video of a **recalibrated vehicle**



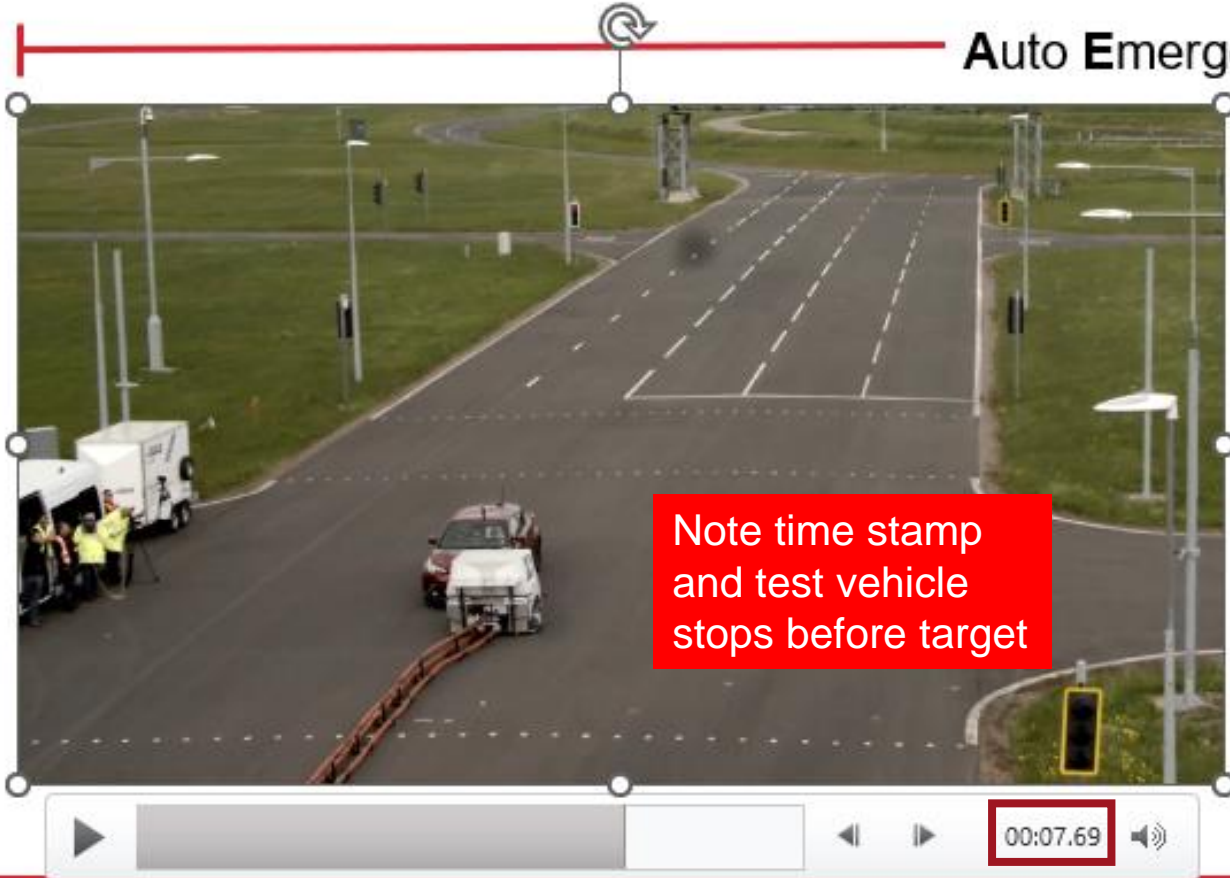
Excerpt from a video of a **purposefully mis-calibrated vehicle**

1° of difference in camera angle cuts reaction time by more than half

- 130 yards = the average site distance for the camera of a passenger car
- 50 yards = the distance 1 degree of camera pitch angle can make
- 30 yards per second = the distance we travel at 65mph

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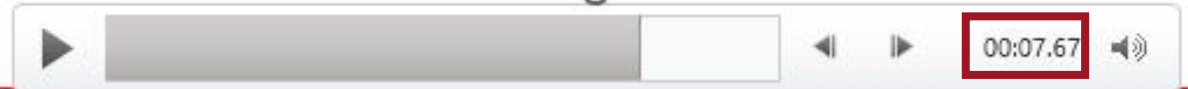
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In Conclusion:

What is this subject all about?

Safety.

Doing the job right. (Assumed by consumers)

Caring.

There are added complexities for sure but that's our **duty** *and* **opportunity** to solve ... for each other.

Thank You