



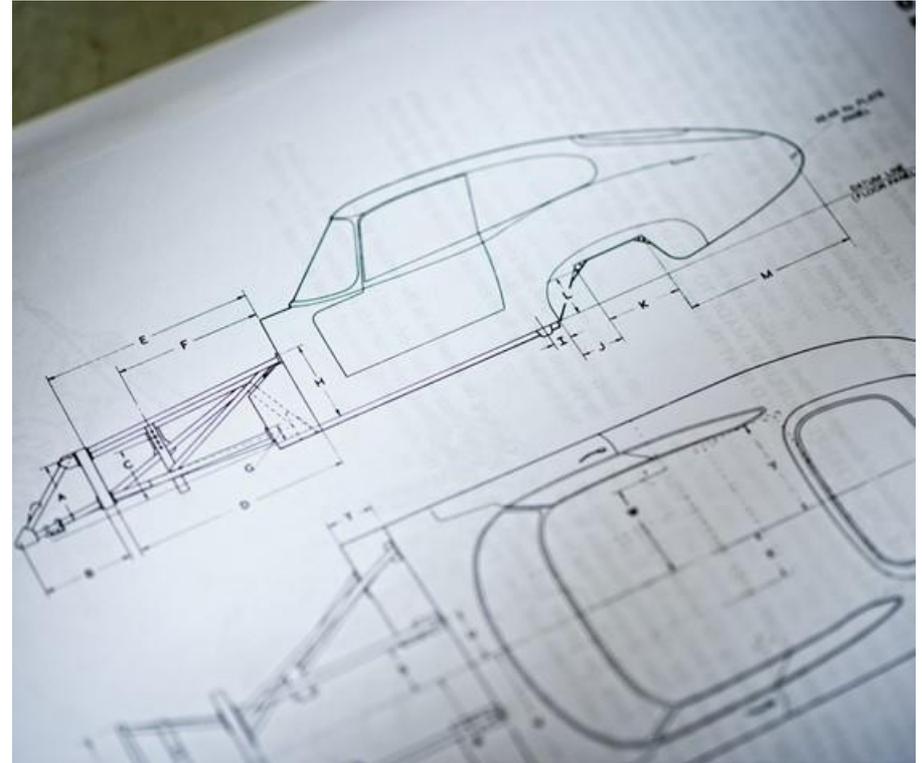
# Move to lightweight designs

## NDT Challenges

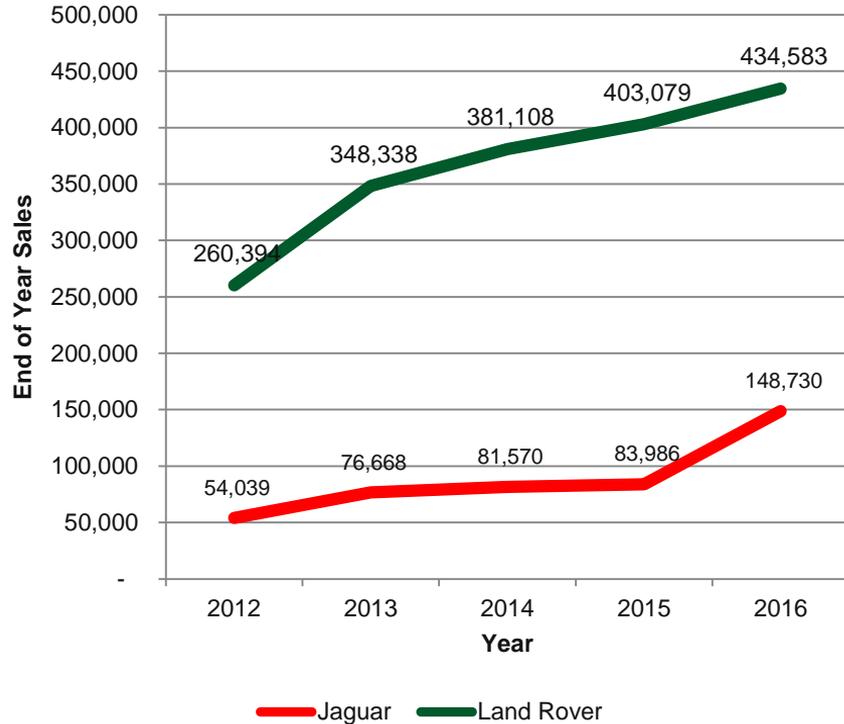
T. Gethin Davies

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- Background
- Drivers for lightweighting
- Where we currently are
- Where we could be going
- The need for NDT technology
- Challenges in adopting NDT
- Summary



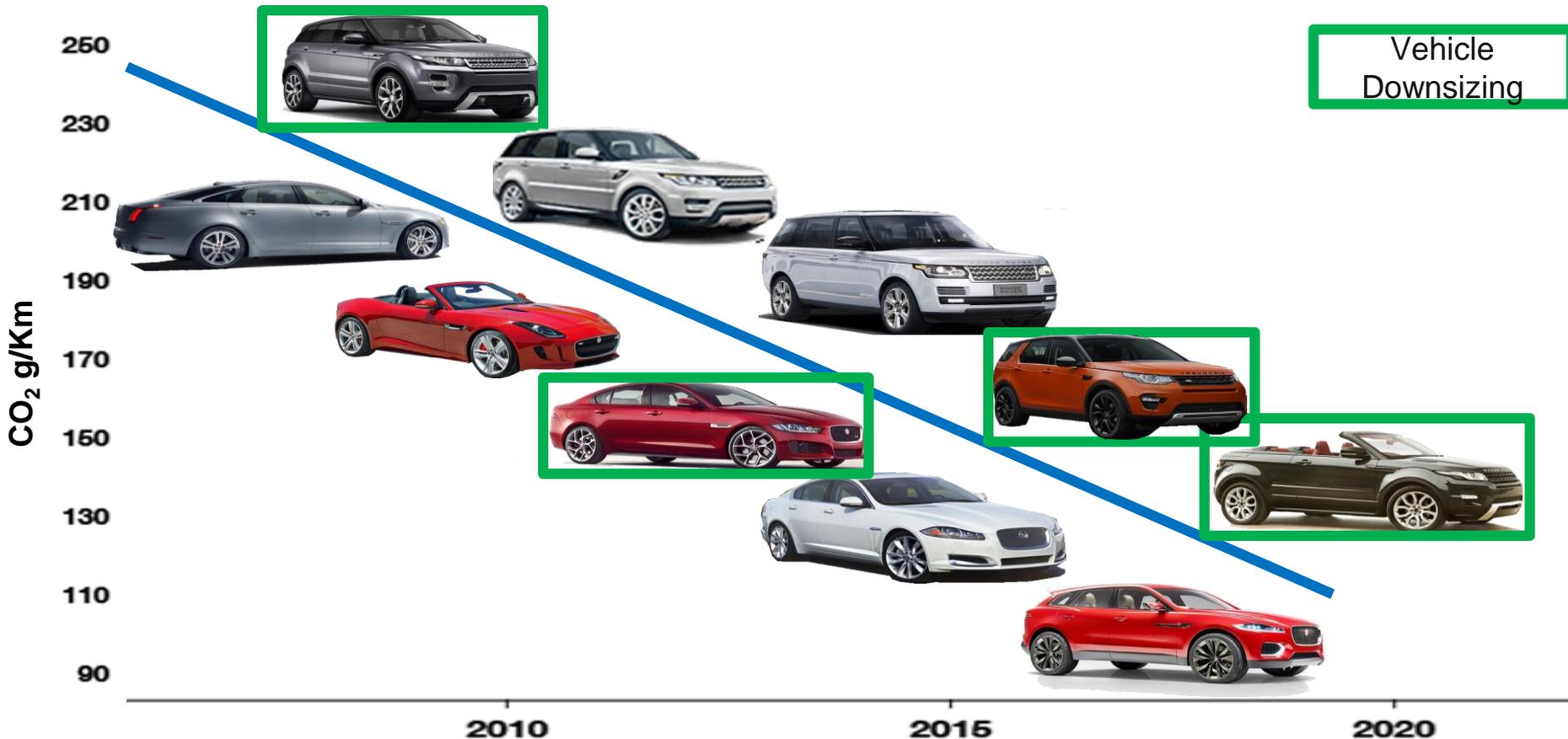
# Background



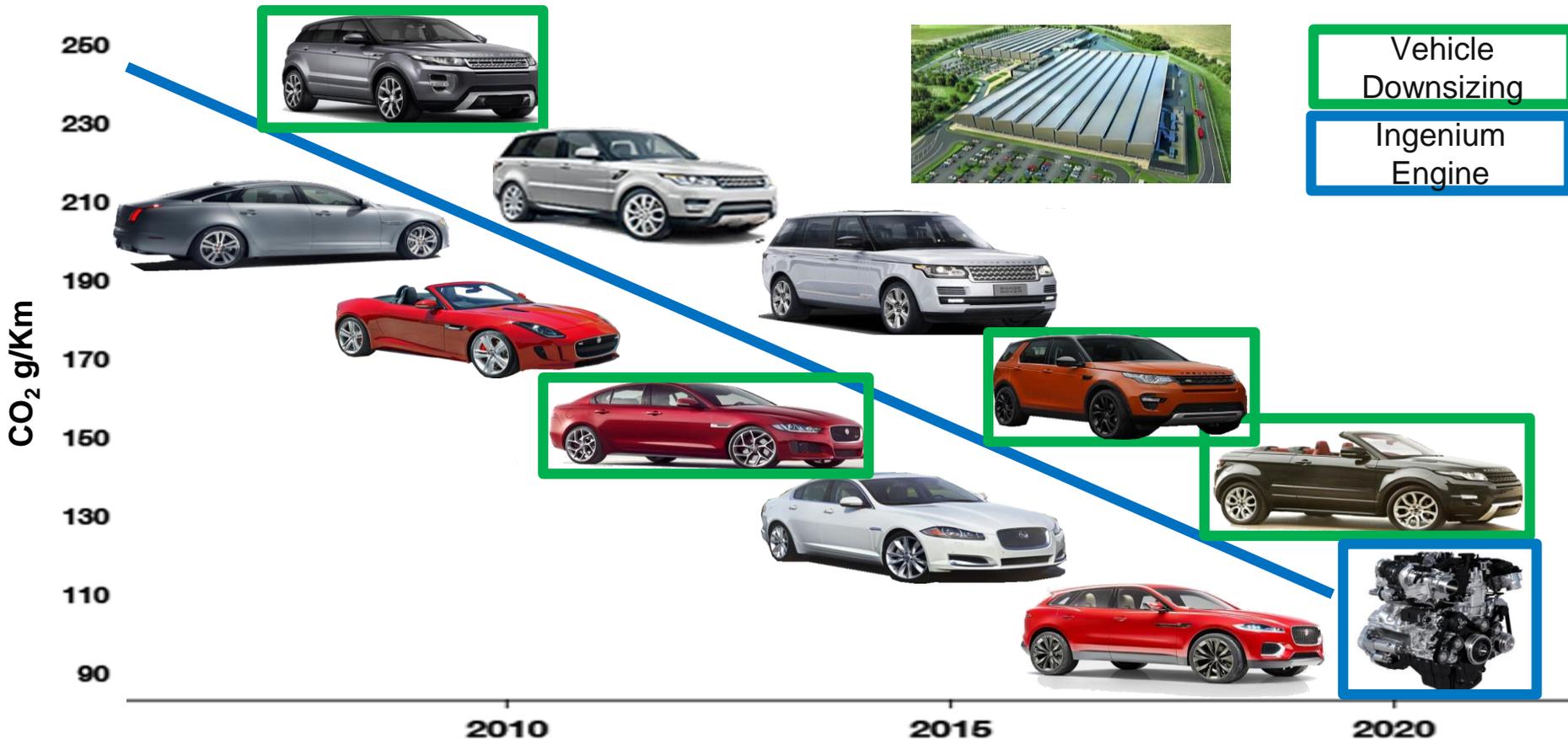
# Environmental Improvement



# Environmental Improvement



# Environmental Improvement





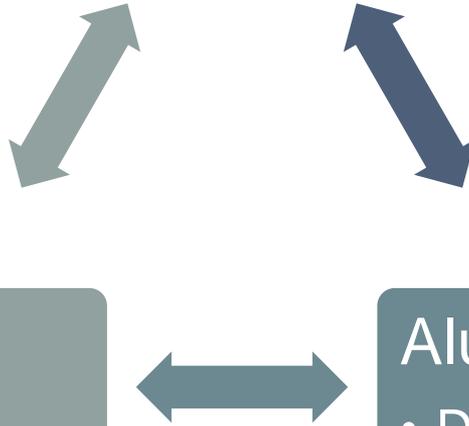


Mixed Metal  
• D7a



Aluminium  
• D7u

Steel  
• D8





## Mixed Material

- Mixture of Steel, Aluminium and **Composite materials**
- Right material – Right place



# The main challenges



## Cost

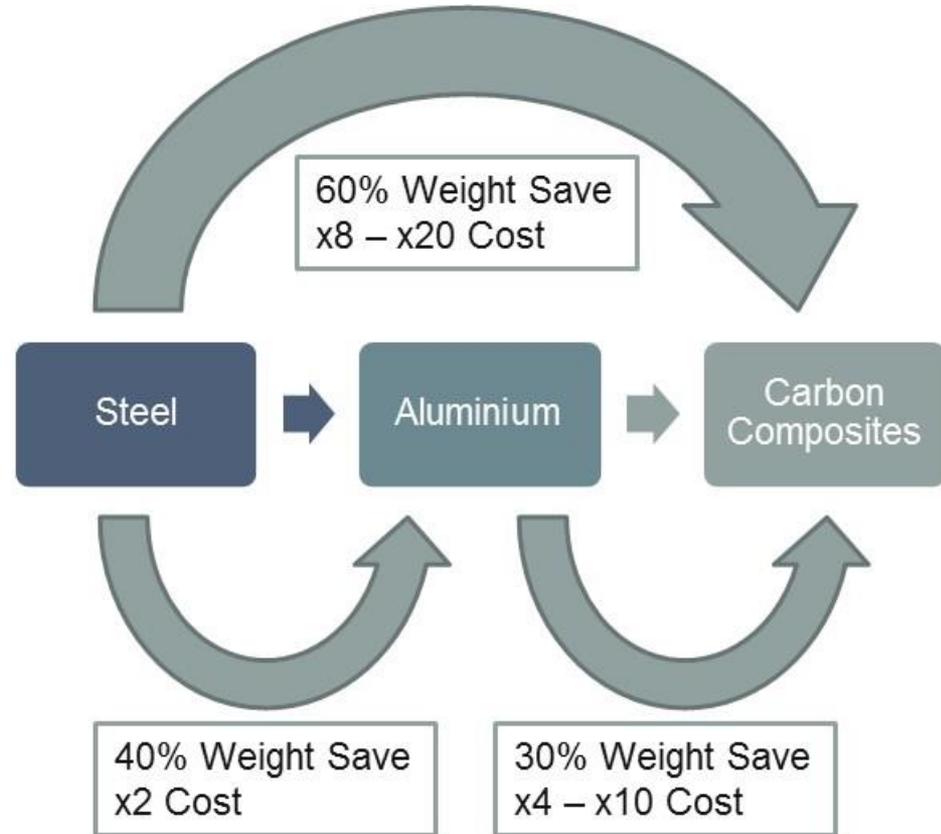
- Possibly greatest hurdle
- Very high

## Volume

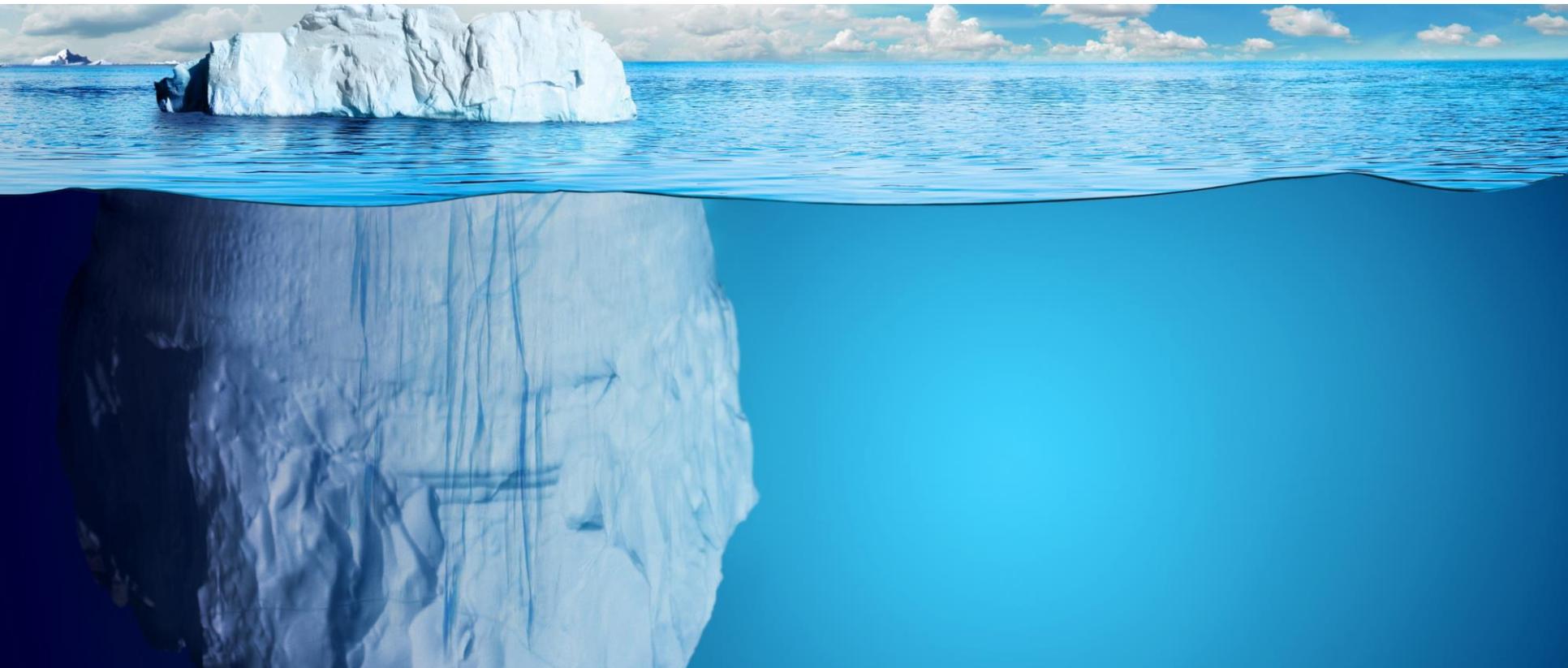
- Cycle times
- Investment in infrastructure

## Knowledge

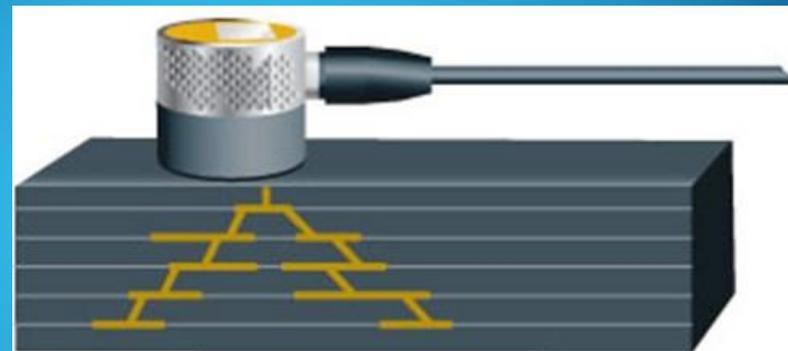
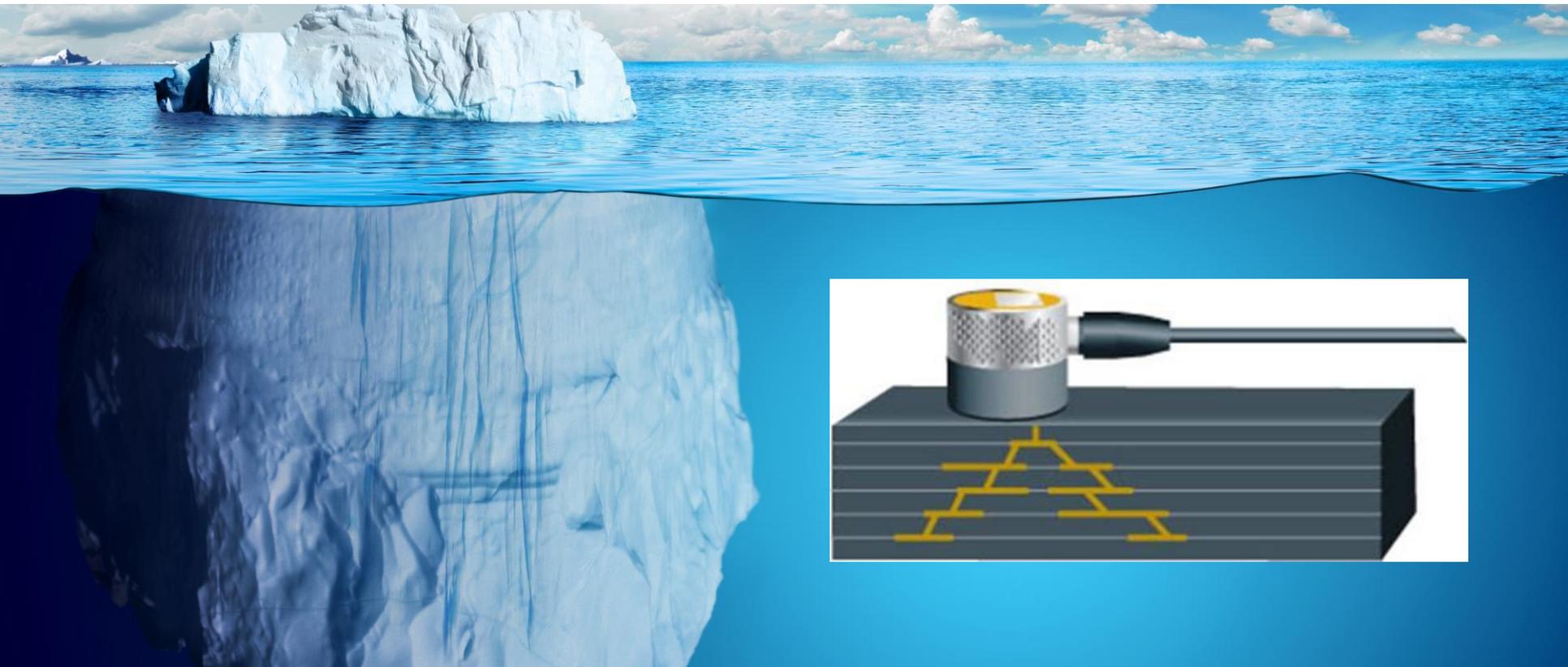
- Education
- Design
- Nature of Damage



# Damage in composites and avoidance in Automotive Structures



# Damage in composites and avoidance in Automotive Structures



# Core, Transition and Periphery



## Core

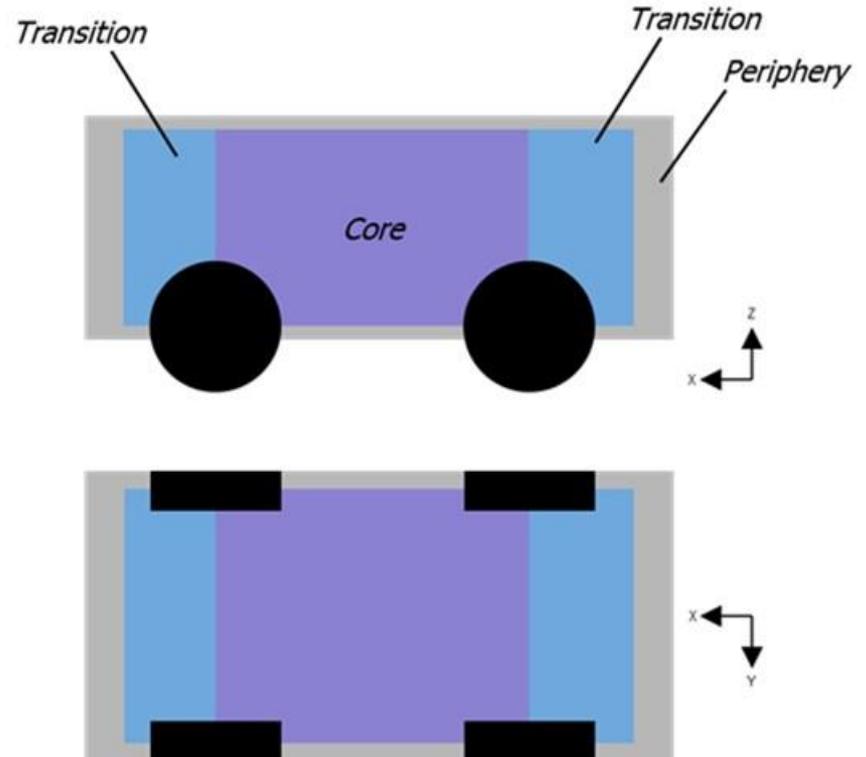
- Elastic deformation only
- Heavily protected
- Difficult to repair

## Transition

- Sacrificial/Energy absorbing
- Protect as necessary

## Periphery

- Non or minimally structural
- Not possible to protect



**Note:** This is not a JLR strategy, rather an alternative conceptual approach for discussion on the topic of NDT

# Protection of Composites in a Production environment



Composite Structure delivered by Supplier

OEM randomly checks to ensure integrity (?)

Accept/Reject



# Protection of Composites in a Production environment



Event

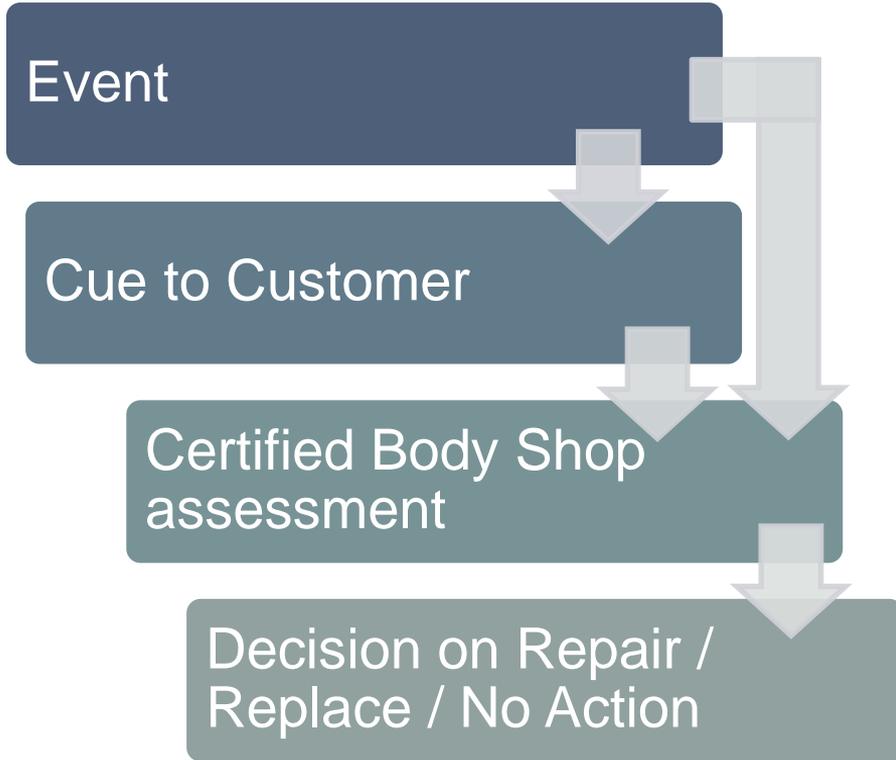
Fast scanning,  
quick analysis

Rapid decision on  
continue/replace  
part(s)

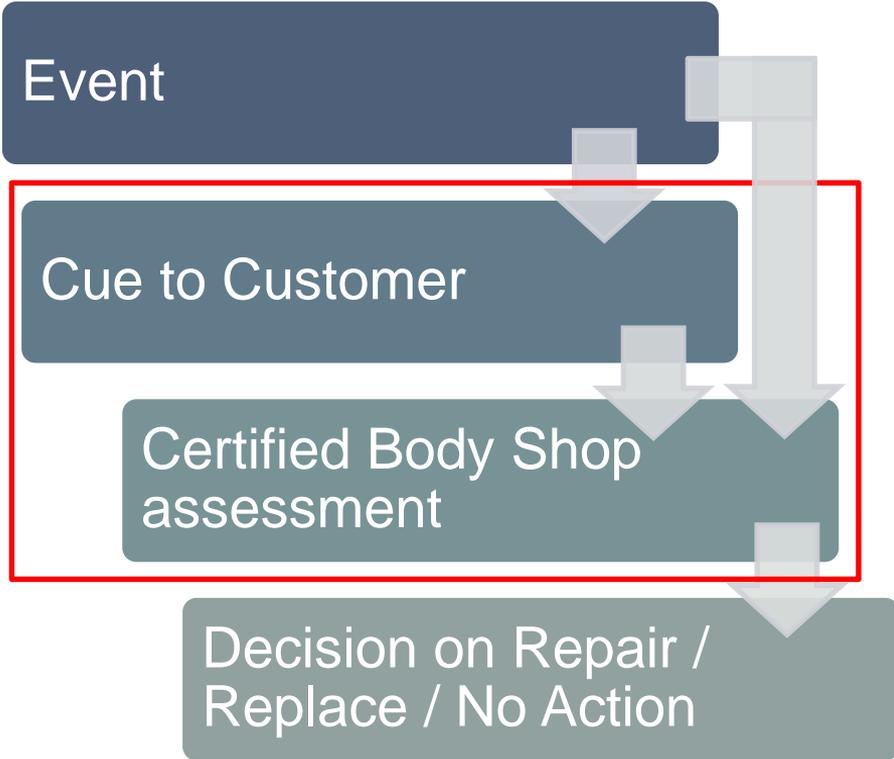




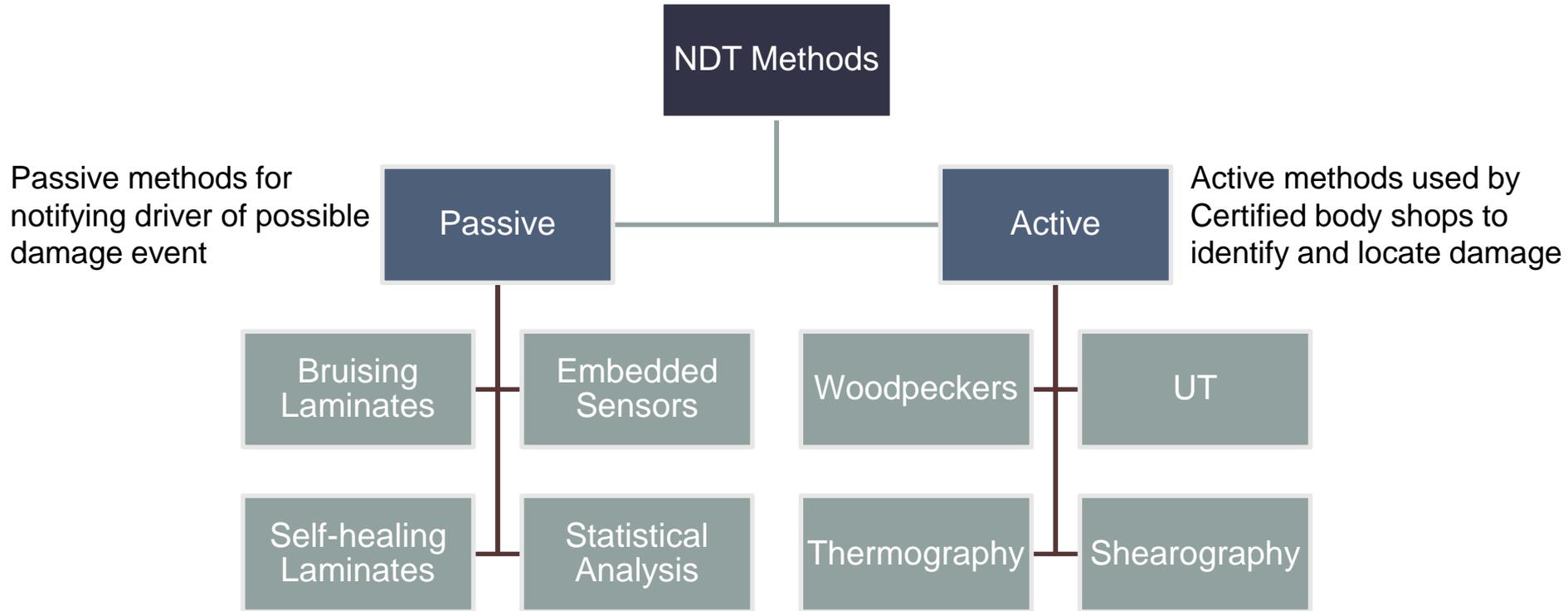
# Protection of Composites in an After market environment



# Protection of Composites in an After market environment



# Possible methods of assessing damage



## Technology

- Fast
- Reliable
- Adaptable
- Tangible

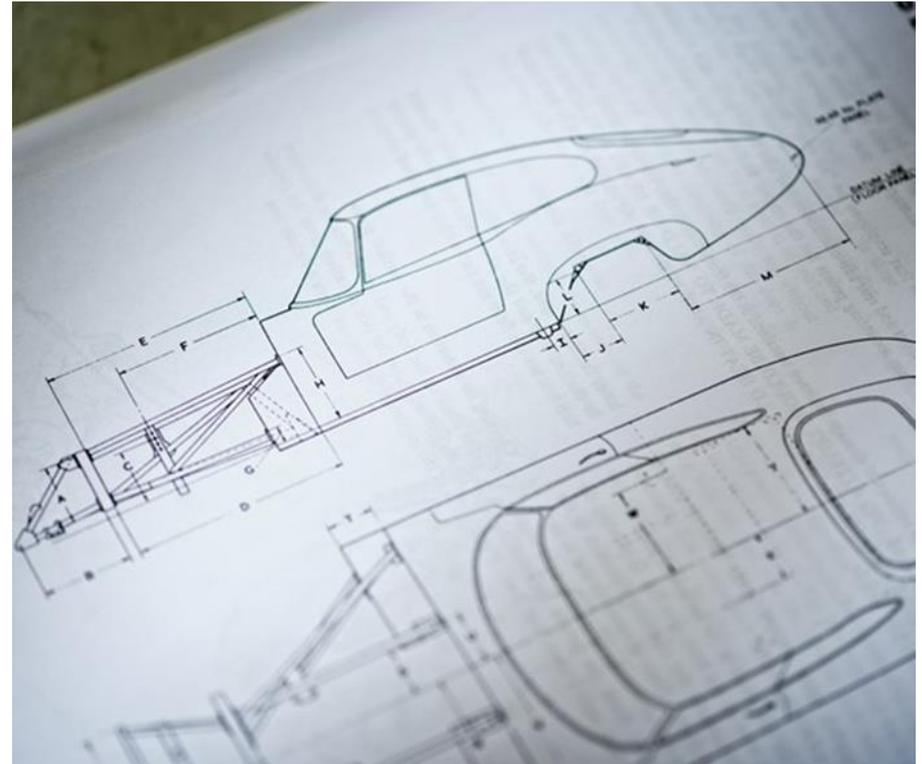
## Engagement

- Insurance industry
- Certified body shops

## Training & Education

- Shifting the paradigm
- Minimum training requirements

- Where we currently are
- Where we could be going
- How we could protect composites using NDT in:
  - Manufacturing environments
  - Aftermarket environments
- What the automotive industry will need to develop



# Ten Words



Lightweighting means incorporating composites – how do we effectively find damage?



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THANK YOU

**T. Gethin Davies**

Advanced Body Technology

Mobile        +44(0)7469 039 588

[tdavies9@jaguarlandrover.com](mailto:tdavies9@jaguarlandrover.com)

**Jaguar Land Rover**

W/1/26 Abbey Road, Whitley

Coventry CV3 4LF, UK

[jaguarlandrover.com](http://jaguarlandrover.com)