



The CAE Driven Safety Development Process of the new Ford Fiesta

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Ford Fiesta – CAE Driven Safety Process

Agenda

- The New Ford Fiesta
- Safety Requirements and Achievements
- Structural and Safety Strategy
- CAE Development Process
- Questions & Answers



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3

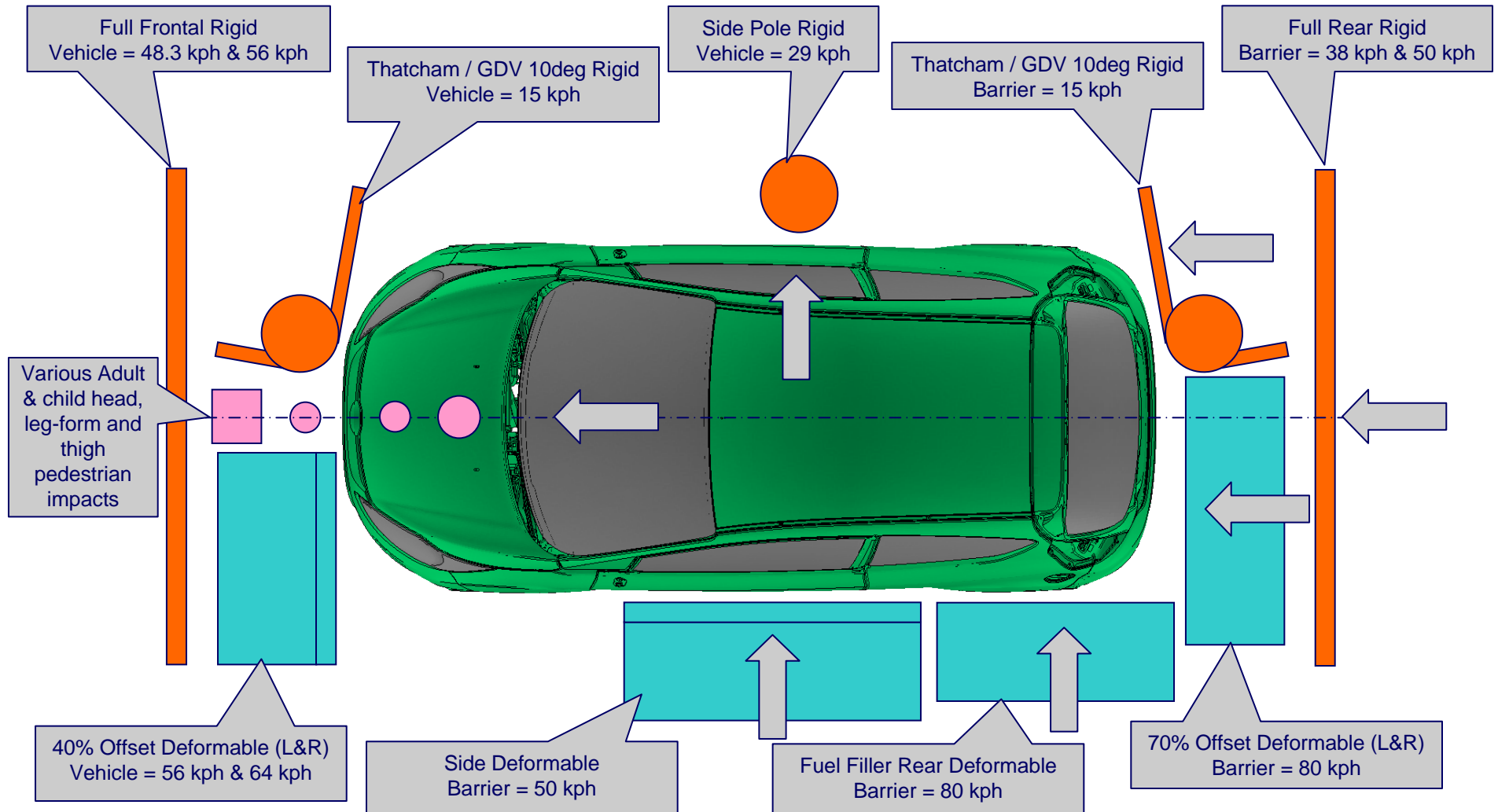
The New Fiesta



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Safety Requirements

European Crash Sign-off Modes – High and Low Speed



Safety Achievements

Final ratings

5-star EuroNCAP rating

Ford Fiesta

RATING	SCORE	Front: 14,9	Side: 15,6	Seatbelt reminder: 2	Pole: 2
ADULT OCCUPANT ★★★★★	34				
CHILD OCCUPANT ★★★★★☆	38				
PEDESTRIAN ★★★☆☆	20				

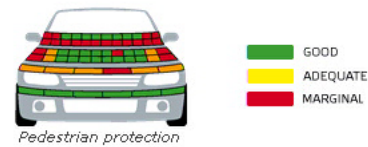
Adult occupant protection



Child restraints

18 month old Child	Britax Roemer BabySafe ISOFIX, rearward facing
3 year old Child	Britax Roemer Duo Plus, forward facing

Pedestrian protection



1E Thatcham Insurance rating

ABI Cars Search Results

ABI Code	Manufacturer	Model	Series	Year	CC	Fuel Type	Gear Box	No. of Doors	Body Type	Group (1-20)	Group (1-50)	Group Type	Security
175 929 01	FORD	FIESTA STUDIO (59)	6	2008 On	1242	P	M	3		1	2	E	T2

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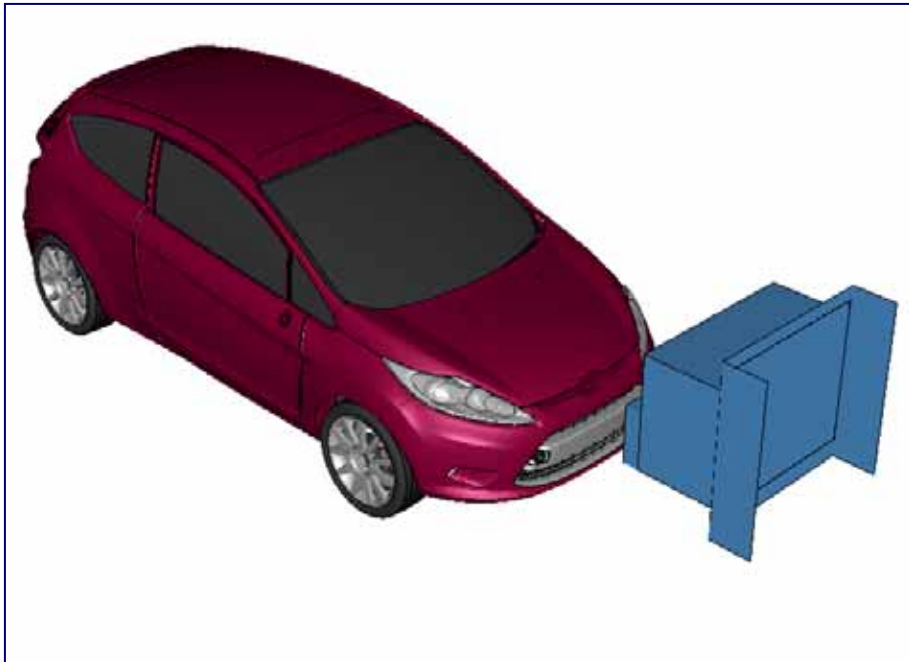
Key

Fuel Type: Petrol, Diesel, Electric Gear Box: Manual, Automatic Body Type: Cabriolet, Estate

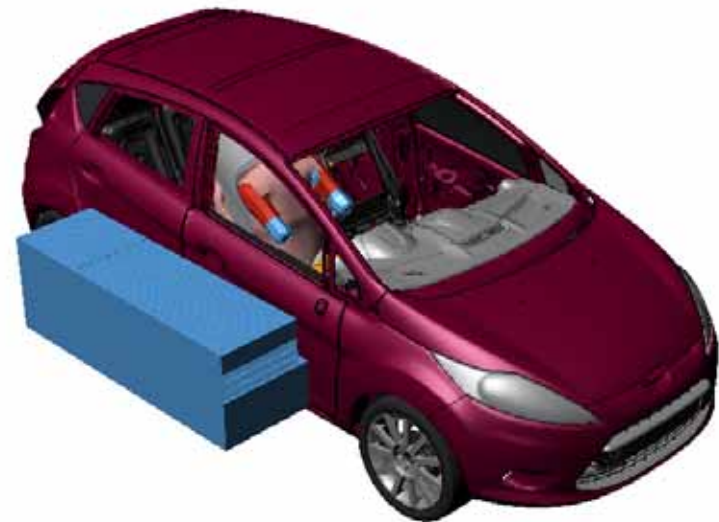


Safety Achievements

EuroNCAP High Speed Crash CAE Simulation Results



EuroNCAP Front Offset Impact



EuroNCAP Side Impact



Safety Achievements

EuroNCAP High Speed Crash Films



EuroNCAP Front Offset Impact



EuroNCAP Side Impact



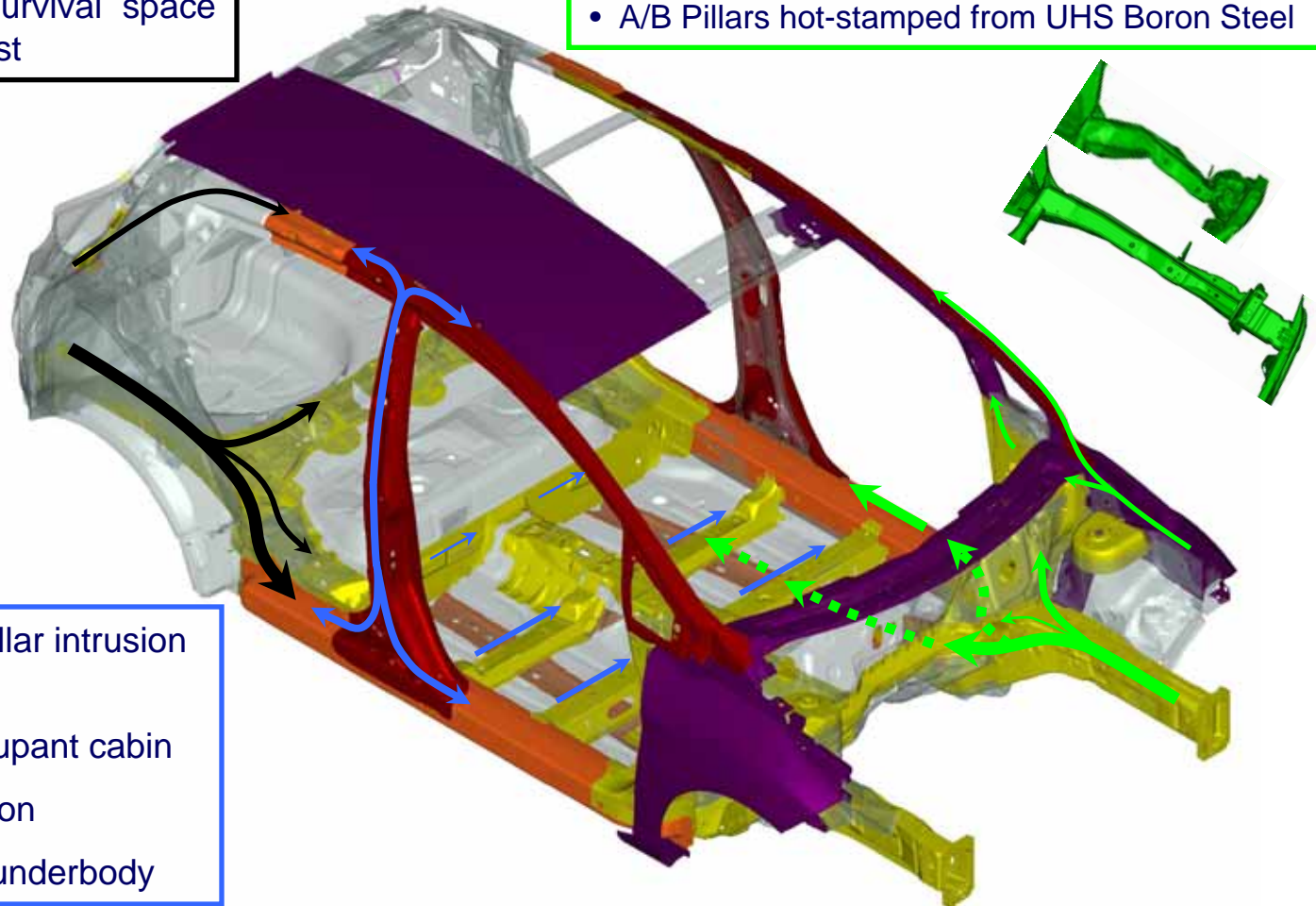
Structural and Safety Strategy

High Speed Impact

- DP600 rear side rails optimised for energy absorption in 80km/h crash mode
- Safety cell for fuel tank survival space and door openability post test

- DP600 front rails with TWB front section to achieve an efficient crush followed by bend and counter-bend collapse strategy
- A/B Pillars hot-stamped from UHS Boron Steel

- UHSS (≥ 800 MPa)
- EHSS (380-800 MPa)
- VHSS (280-380 MPa)
- HSS (180-280 MPa)
- MS (≤ 180 MPa)



- Low velocity “vertical” B-Pillar intrusion profile
- Limit intrusion into the occupant cabin
- Prevent rocker panel rotation
- Transfer load through the underbody



Structural and Safety Strategy

Low Speed Impact



• Hood controlled folding to avoid damage to other parts

- Strong shotgun closing plate
- Fender bracket with integrated headlamp catcher
- Headlamp housing controlled failure

• Lower leg stiffener optimisation to avoid cooling pack damage

• Rear/Front bumper beam and crash cans fitted and optimised



Structural and Safety Strategy

Low Speed Impact

- Low Speed Impact (GDV/AZT)

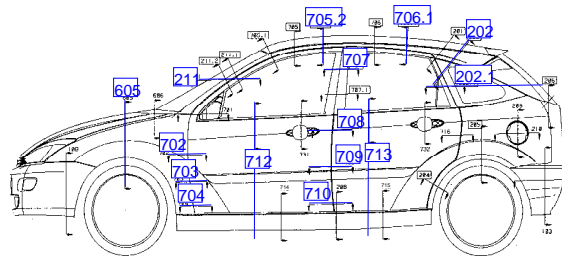


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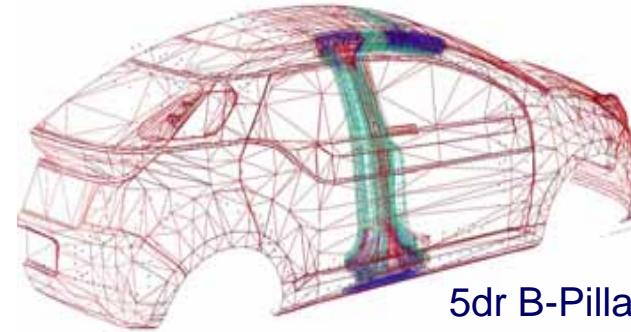
CAE Development Process

“up front” CAE Support

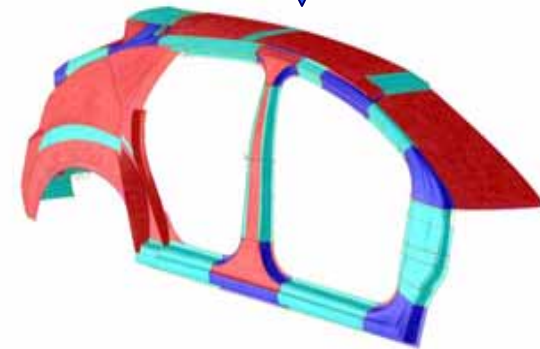
Parametric Concept Geometry to Support early Attribute Assessments



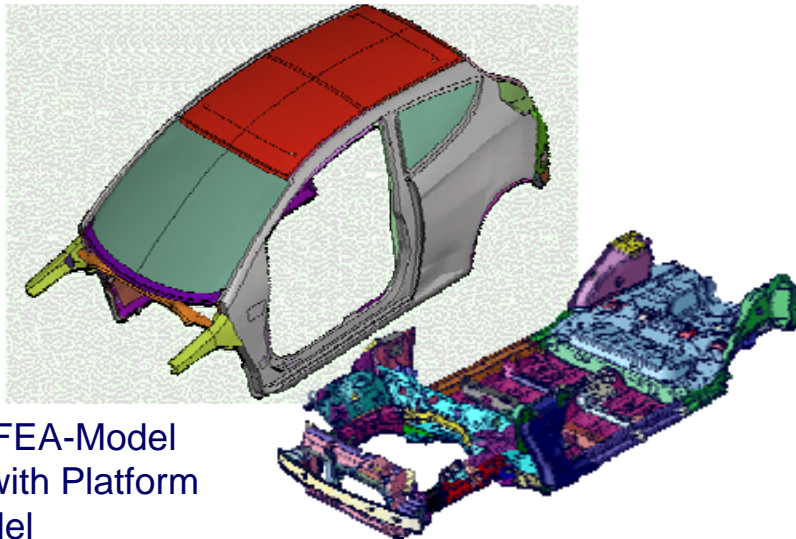
Master Sections



5dr B-Pillar proposal and Design scan



5dr upper structure (template)

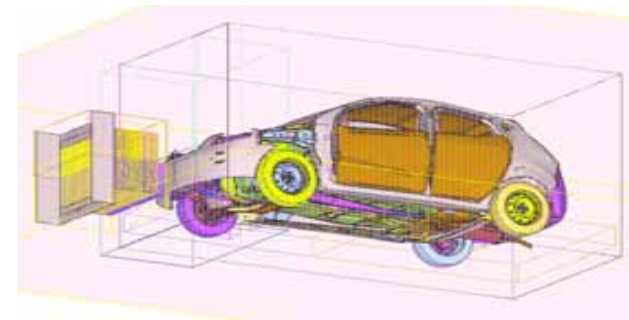
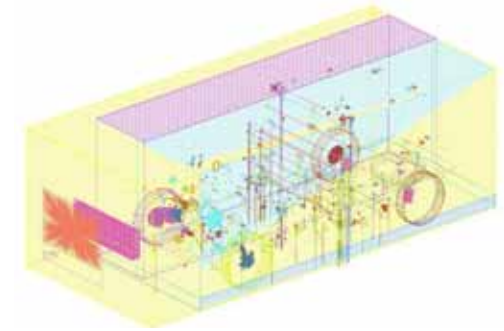


Top Hat FEA-Model merged with Platform FEA-Model



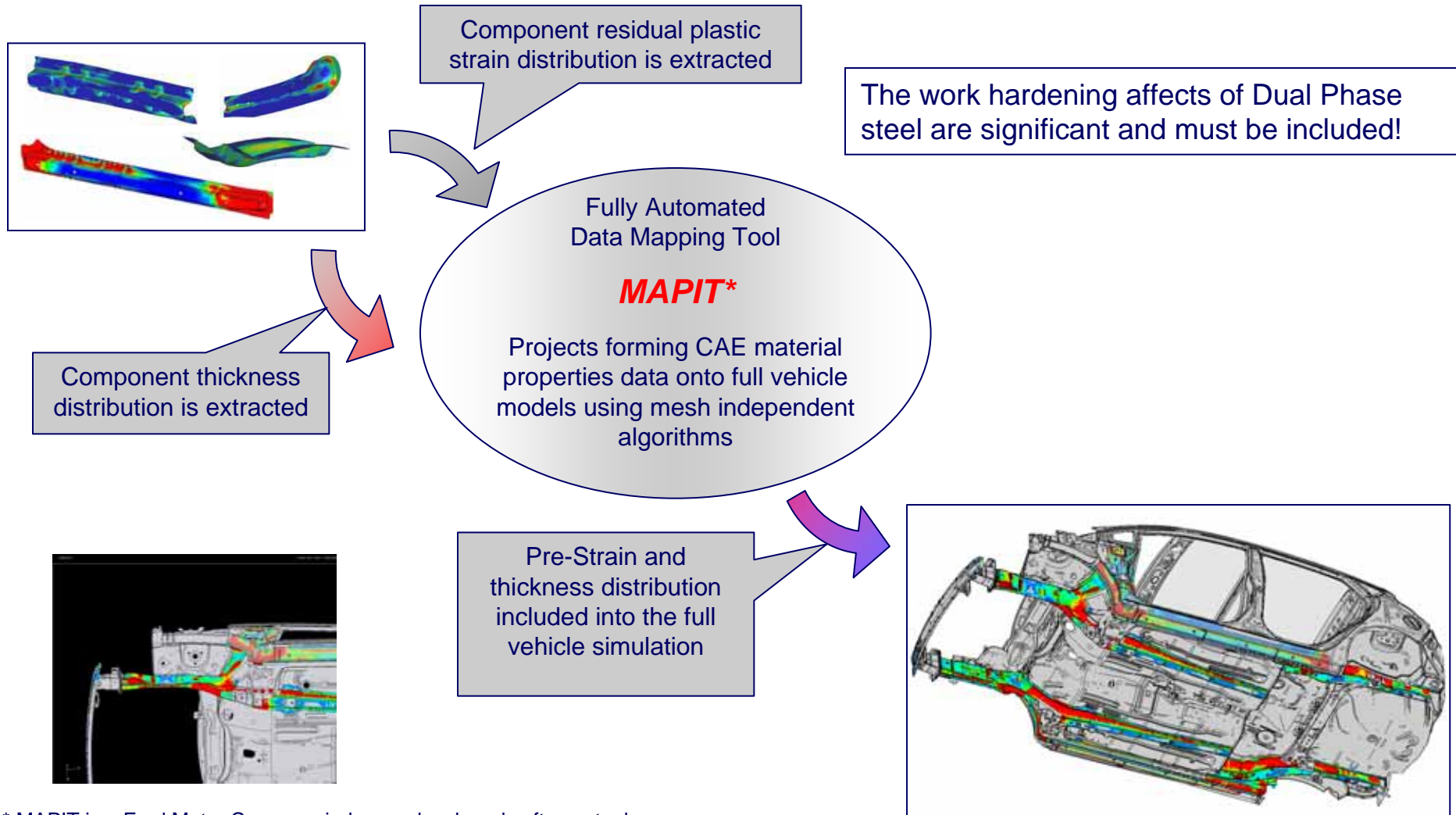
CAE Development Process

The Modular Safety CAE Approach



CAE Development Process

Material History in Crash Simulation / Mapping



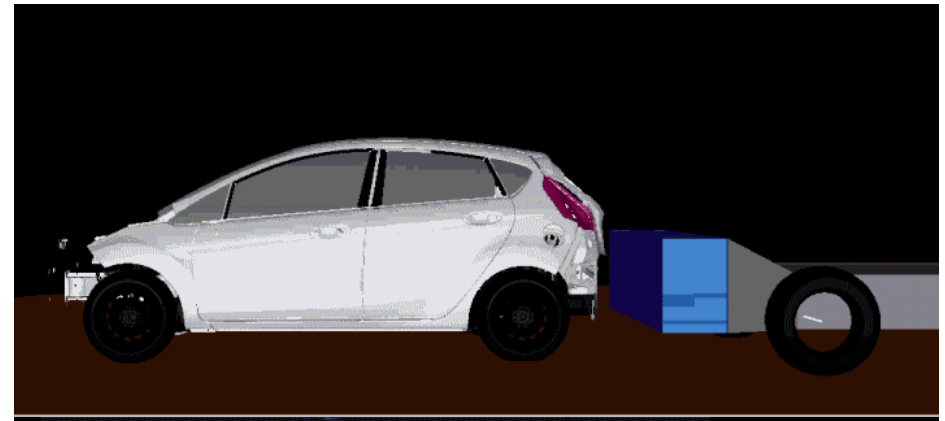
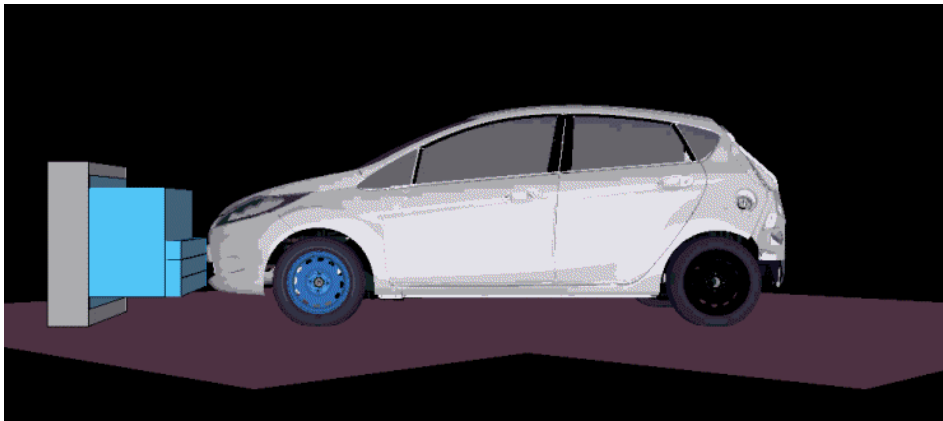
* MAPIT is a Ford Motor Company in-house developed software tool



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Extensively engineered using CAE methodologies

- Crash simulation models have over 1,000,000 elements.
- Super computers are used to run the models, which can take 24 multi-processors over 20hrs to complete!



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Questions & Answers



Thanks for listening

