



MILANO 2015
FEEDING THE PLANET
ENERGY FOR LIFE

L'evoluzione del sistema AV e il Frecciarossa1000



Il nuovo Frecciarossa 1000
Milano 1 luglio 2015 – Marco Sacchi



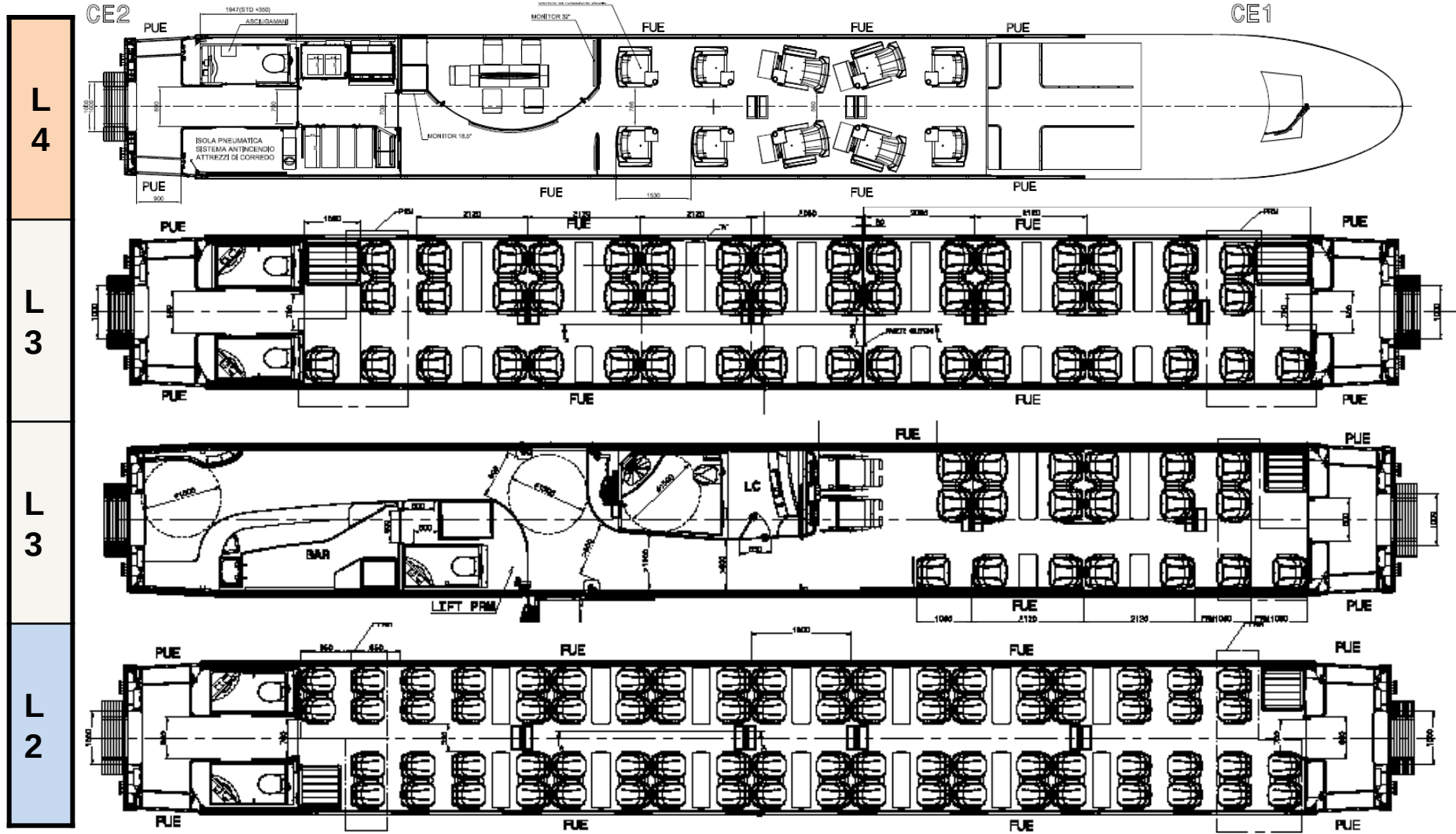
AnsaldoBreda



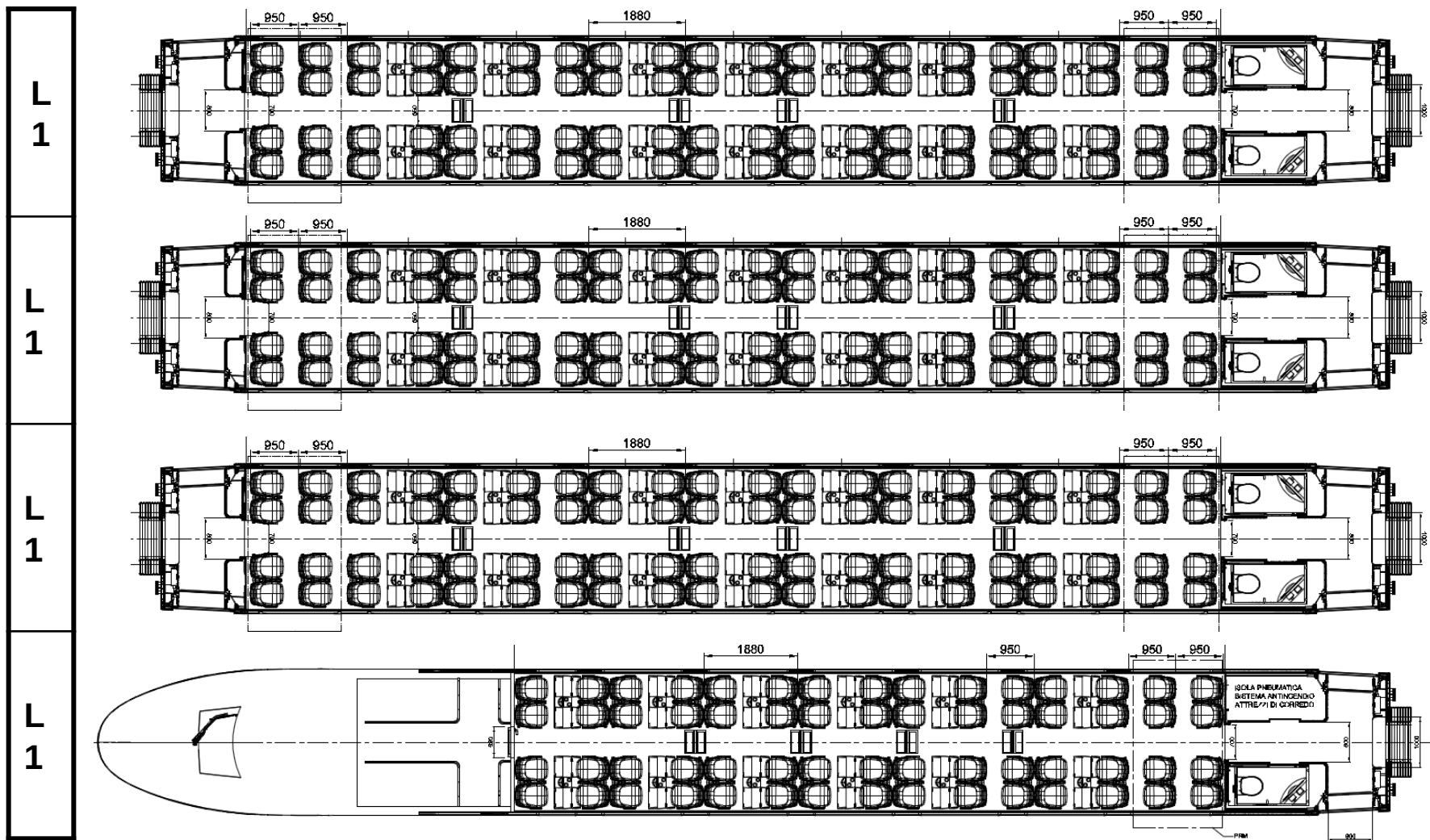
Il nuovo VHS italiano Frecciarossa 1000

- Layout con 4 livelli di servizio per massimizzare l'offerta di confort e capacità di trasporto
- Accessibilità in accordo ai nuovi requisiti essenziali STI
- Ottimizzazione del peso
- Sistemi attivi e passivi di sicurezza
Strategia per gestire i diversi sistemi di segnalamento in Europa
- Impatto ambientale e sostenibilità, primo caso di treno alta velocità certificato EPD

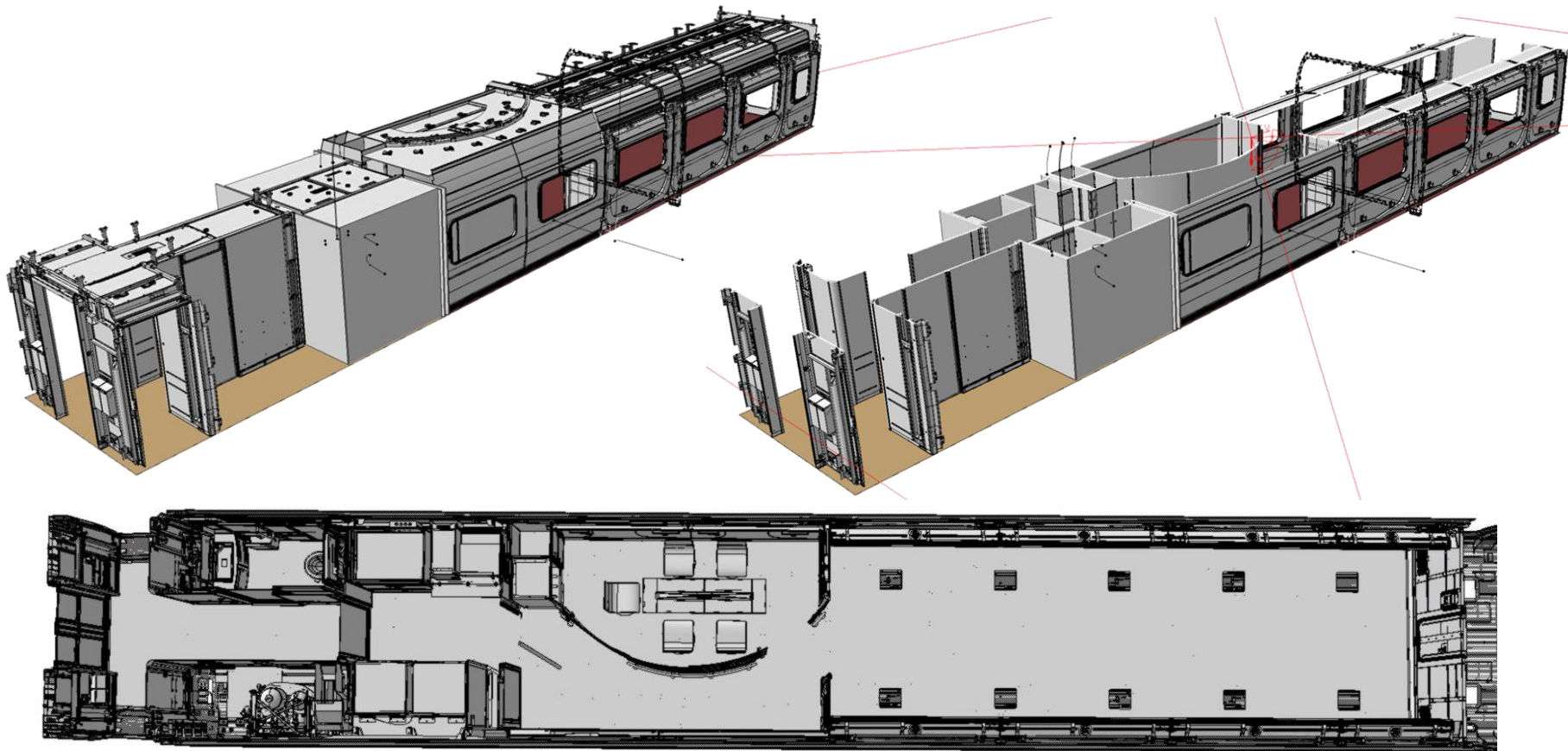
Layout con 4 livelli di servizio



Layout con 4 livelli di servizio



4 livelli di servizio - Livello 4 “Executive”



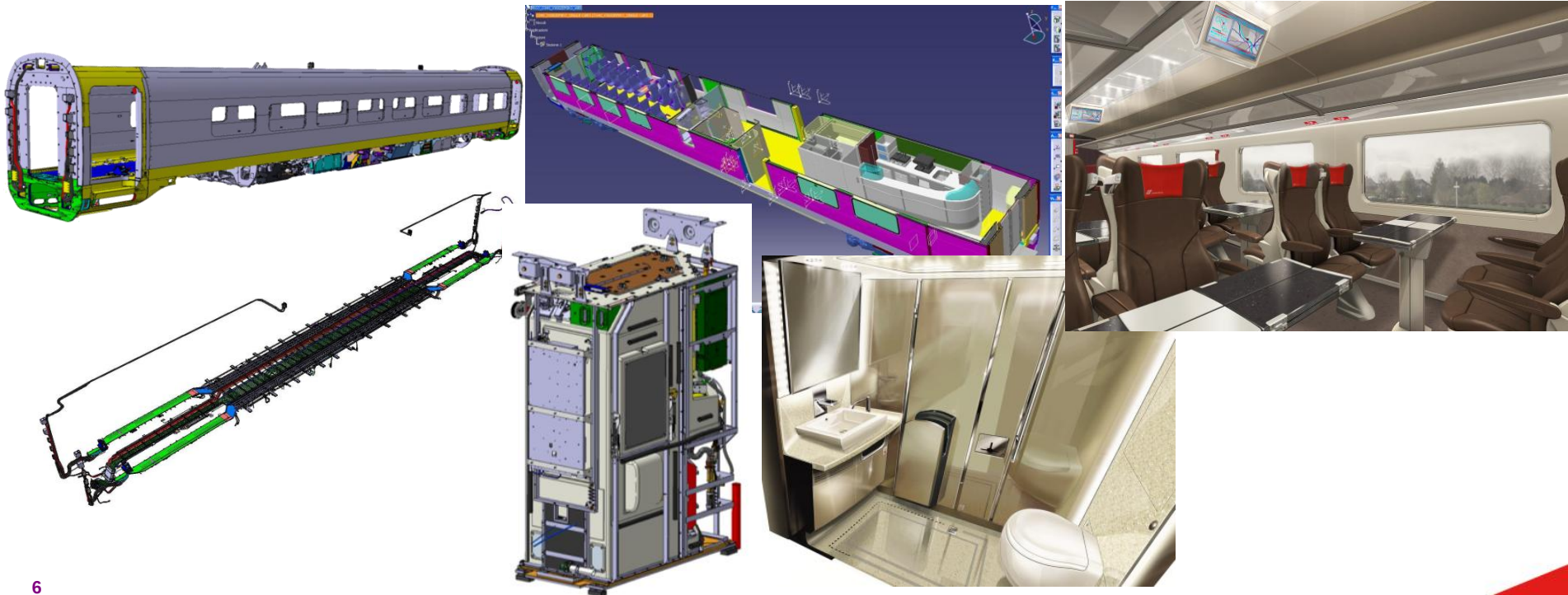
Immagini da modello

3D

Progettazione con modellazione 3D

Modellatori 3D sono stati utilizzati in tutte le fasi di progetto

Più di 800.000 parti modellate sono presenti oggi nel PDM AnsaldoBreda



4 livelli di servizio - Livello 4 “Executive”



COMPARTO



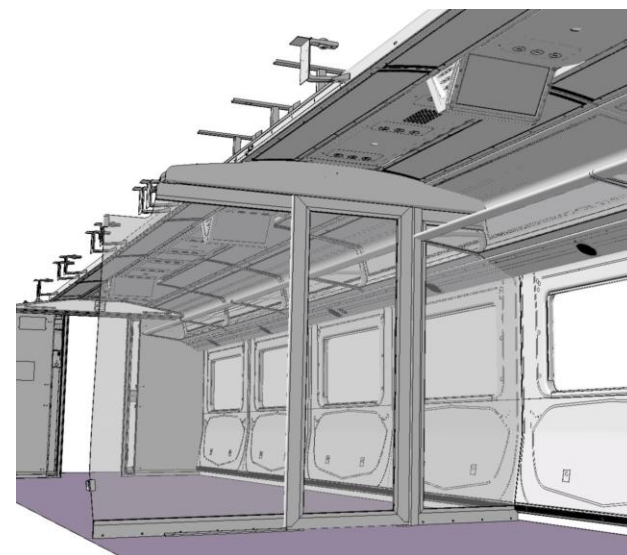
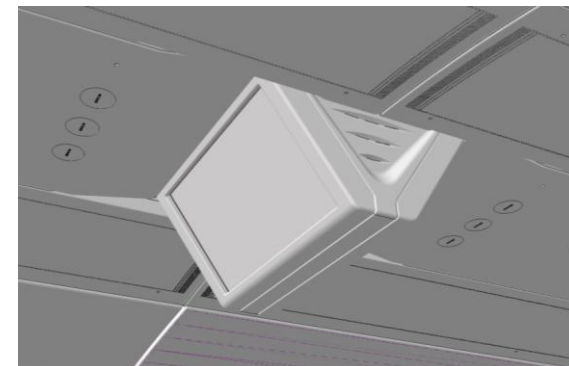
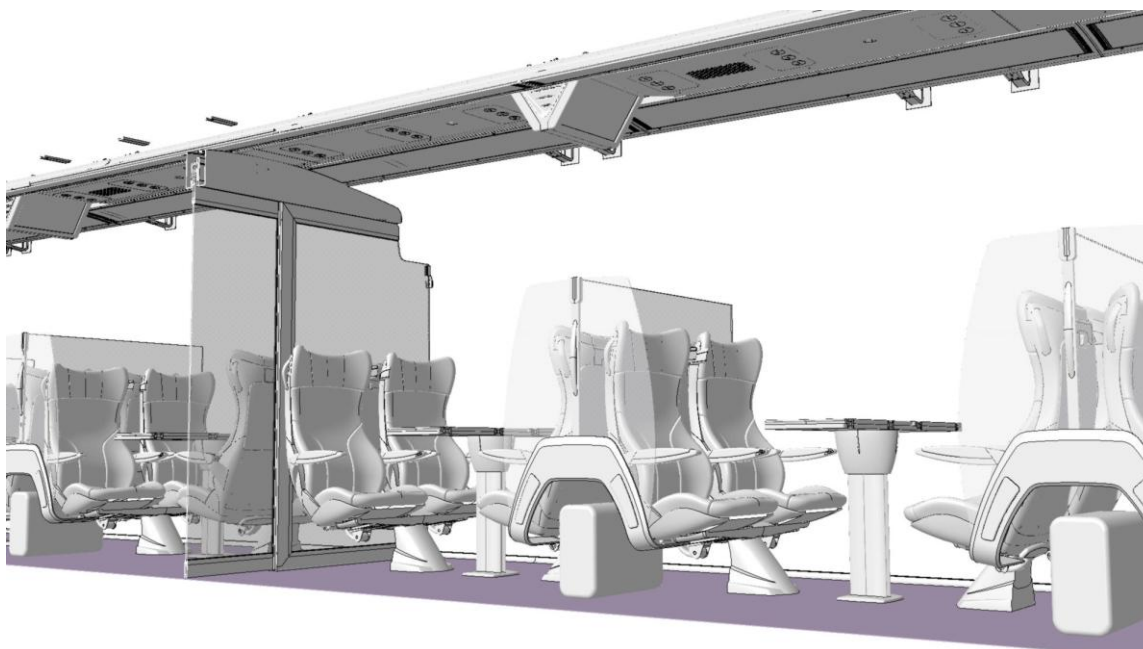
MEETING ROOM



TOILET

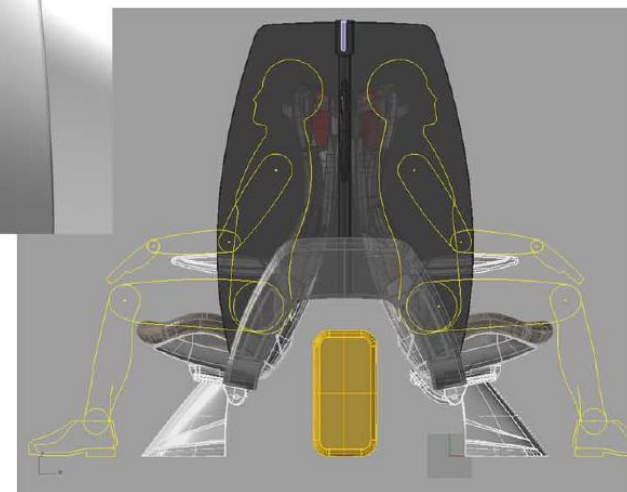
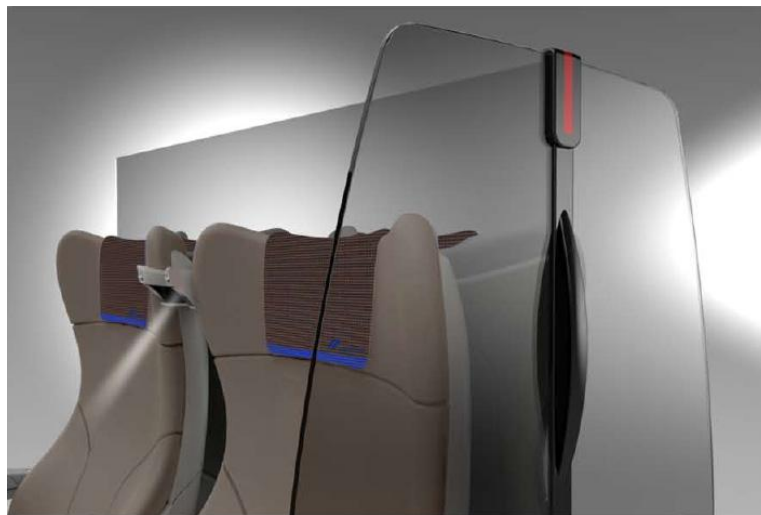


4 livelli di servizio - Livello 3 “Business”



4 livelli di servizio - Livello 3 “Business”

TOILET



Comparto passeggeri

4 livelli di servizio - Livello 2 “Premium”



Comparto passeggeri


BERTONE

TOILET



4 livelli di servizio - Livello 1 “Standard”



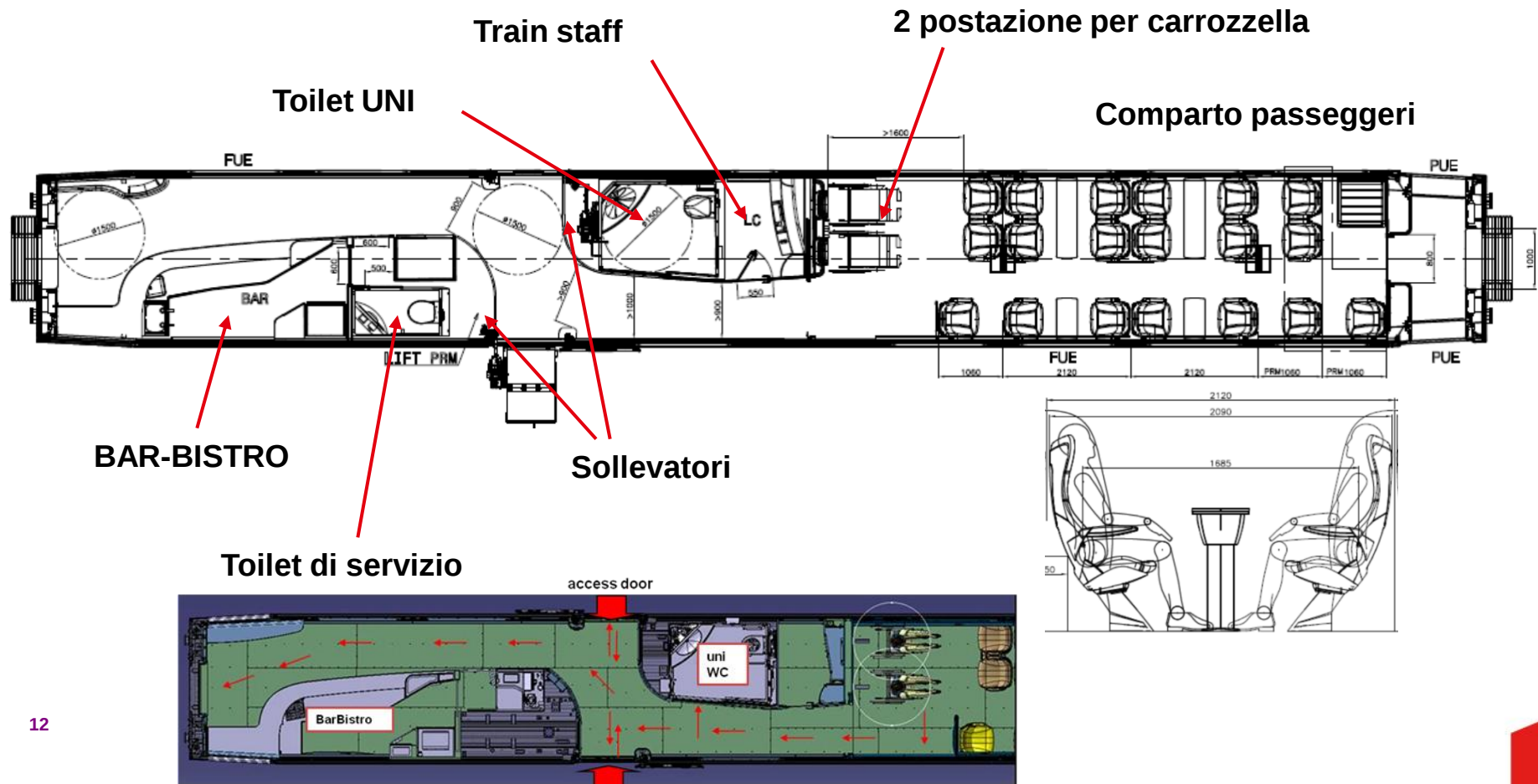
Comparto passeggeri


BERTONE

TOILET

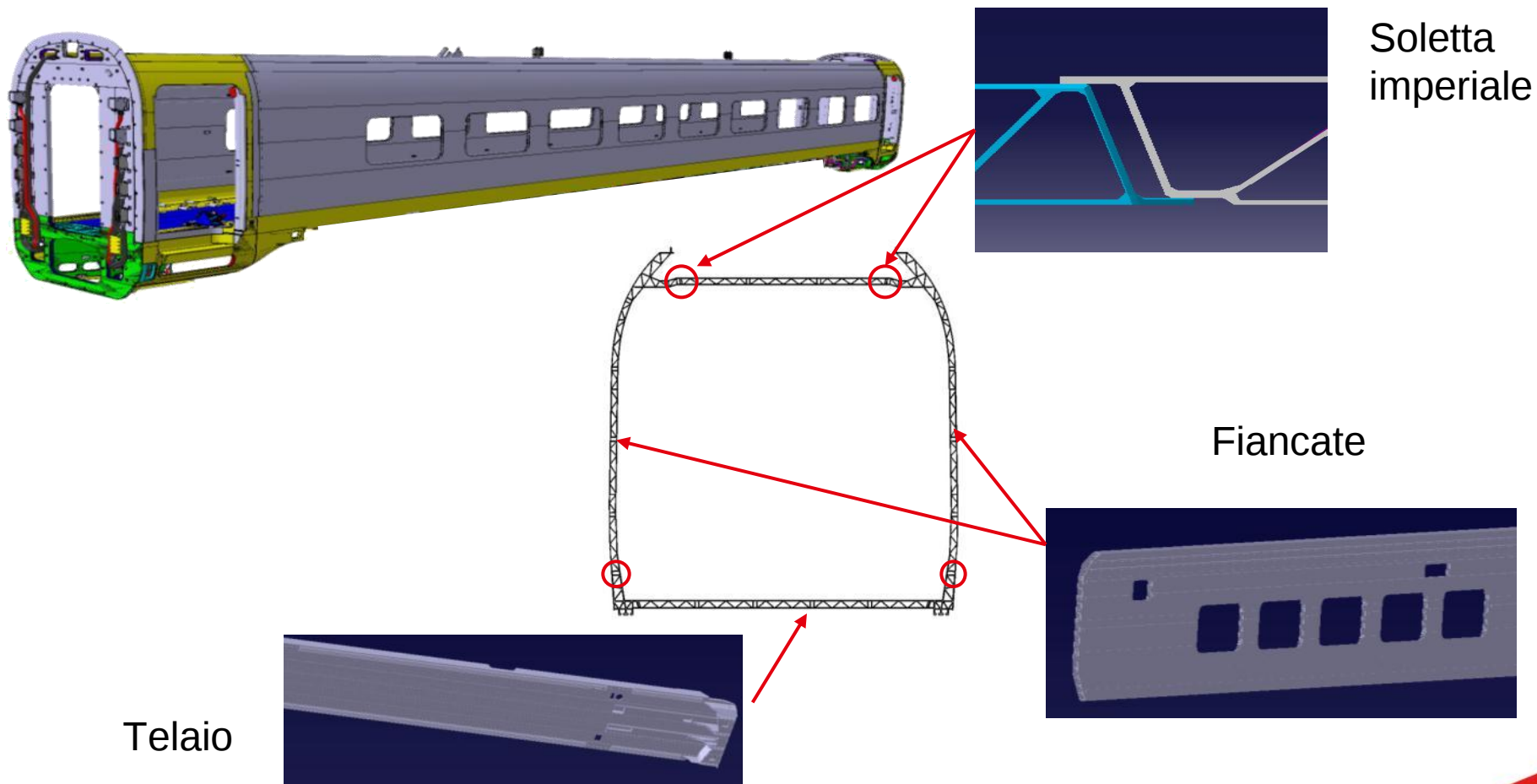


Accessibilità in accordo ai nuovi requisiti essenziali STI



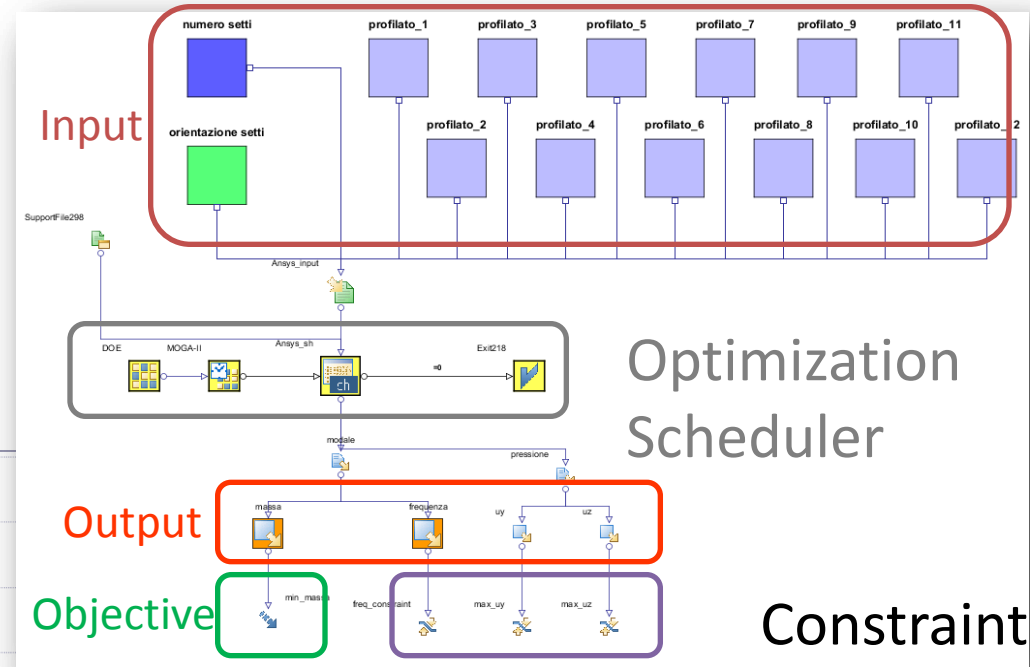
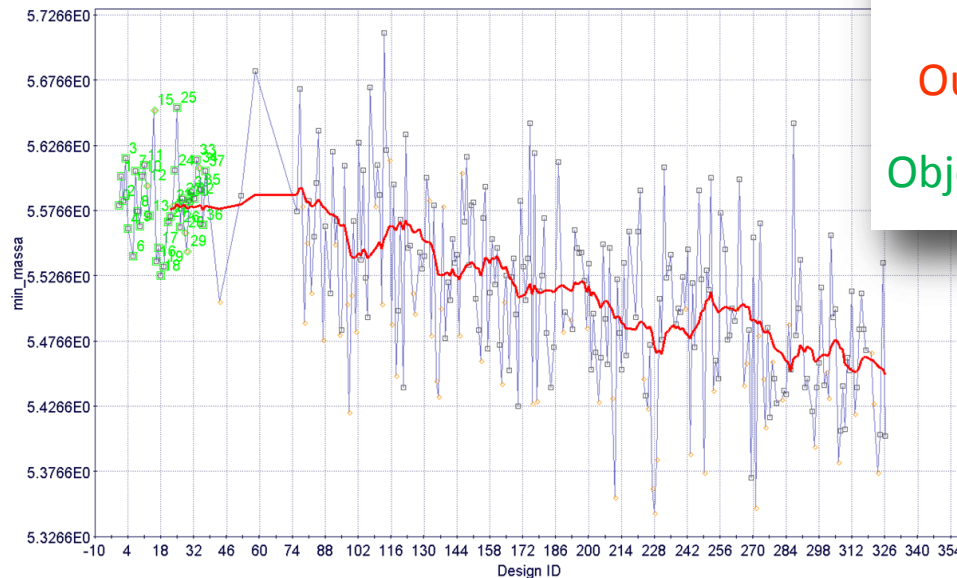
Struttura cassa

La struttura cassa è realizzata da grandi estrusi in lega leggera saldati tra di loro a costituire sotto-assiemi



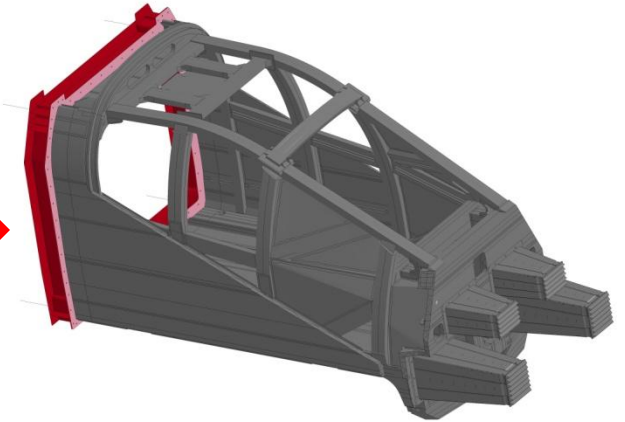
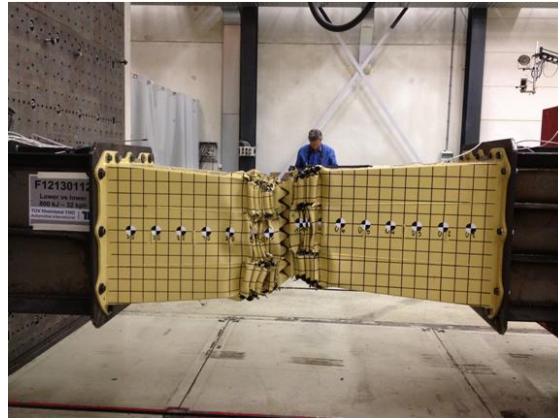
Struttura cassa

Gli estrusi della struttura cassa sono stati disegnati (spessori, posizione e numero dei setti) mediante una tecnica di ottimizzazione per minimizzare il peso.



5,5% di riduzione peso rispetto a metodi tradizionali di progettazione

Sicurezza passiva



Caratterizzazione dei materiali (strain rate)

Test sui componenti

Analisi FEM

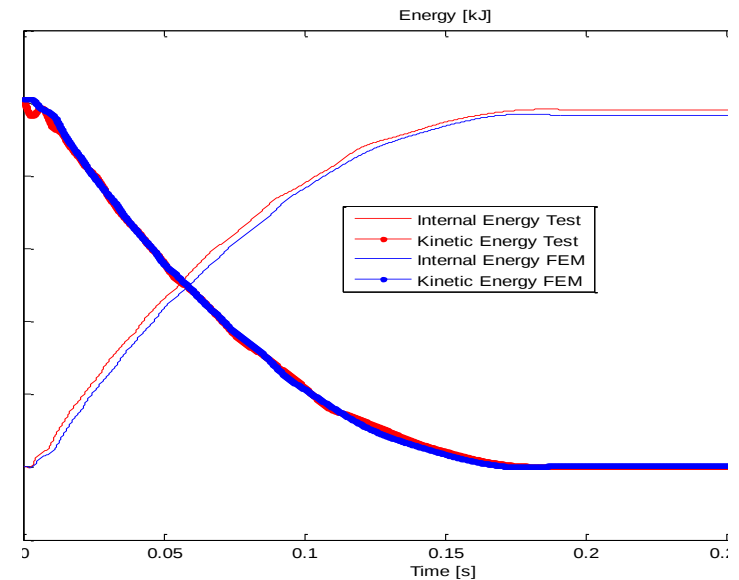
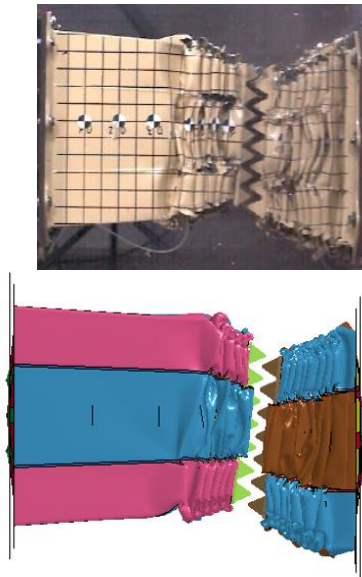
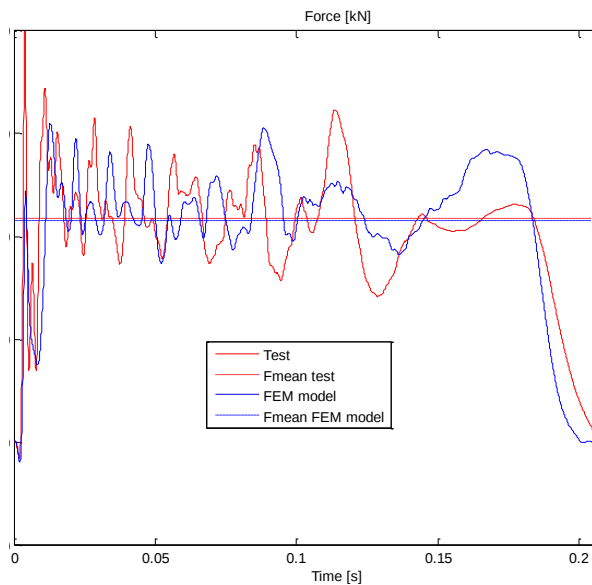


Test full scale

Analisi finale

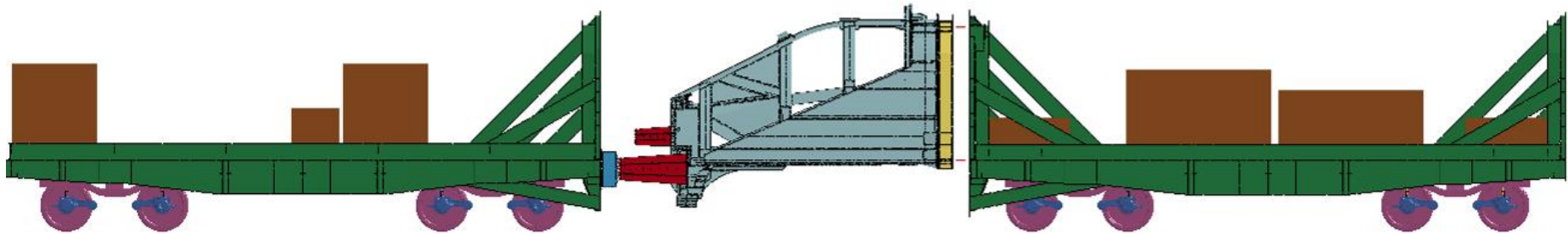
Sicurezza passiva

Test fino a 110km/h e messa a punto del modello FEM



Sicurezza passiva

Test full scale della porzione frontale del Frecciarossa 1000

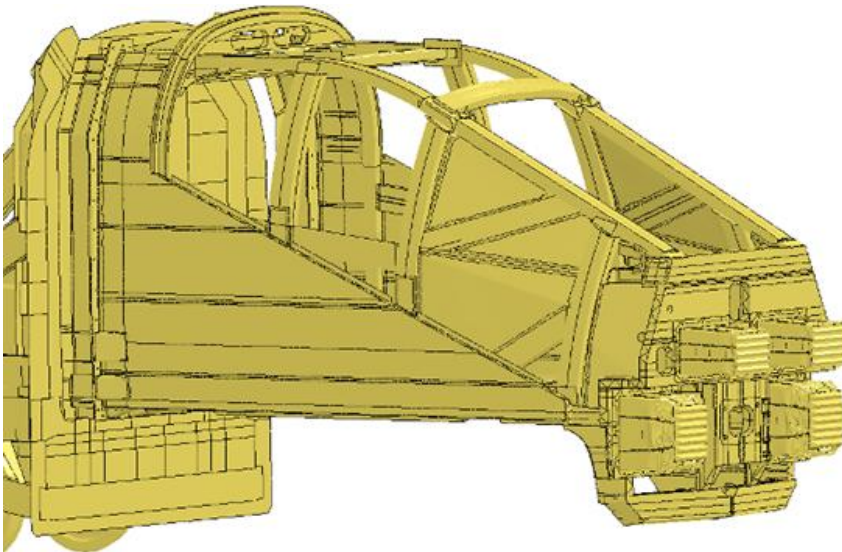




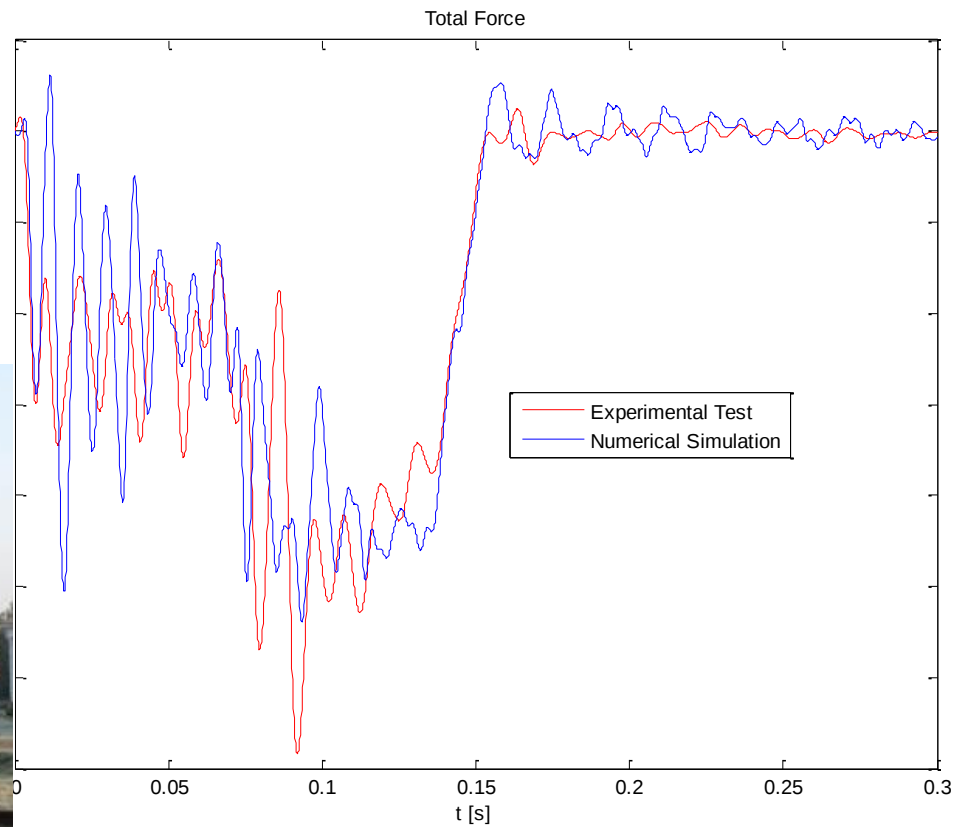
Sicurezza passiva



Sicurezza passiva

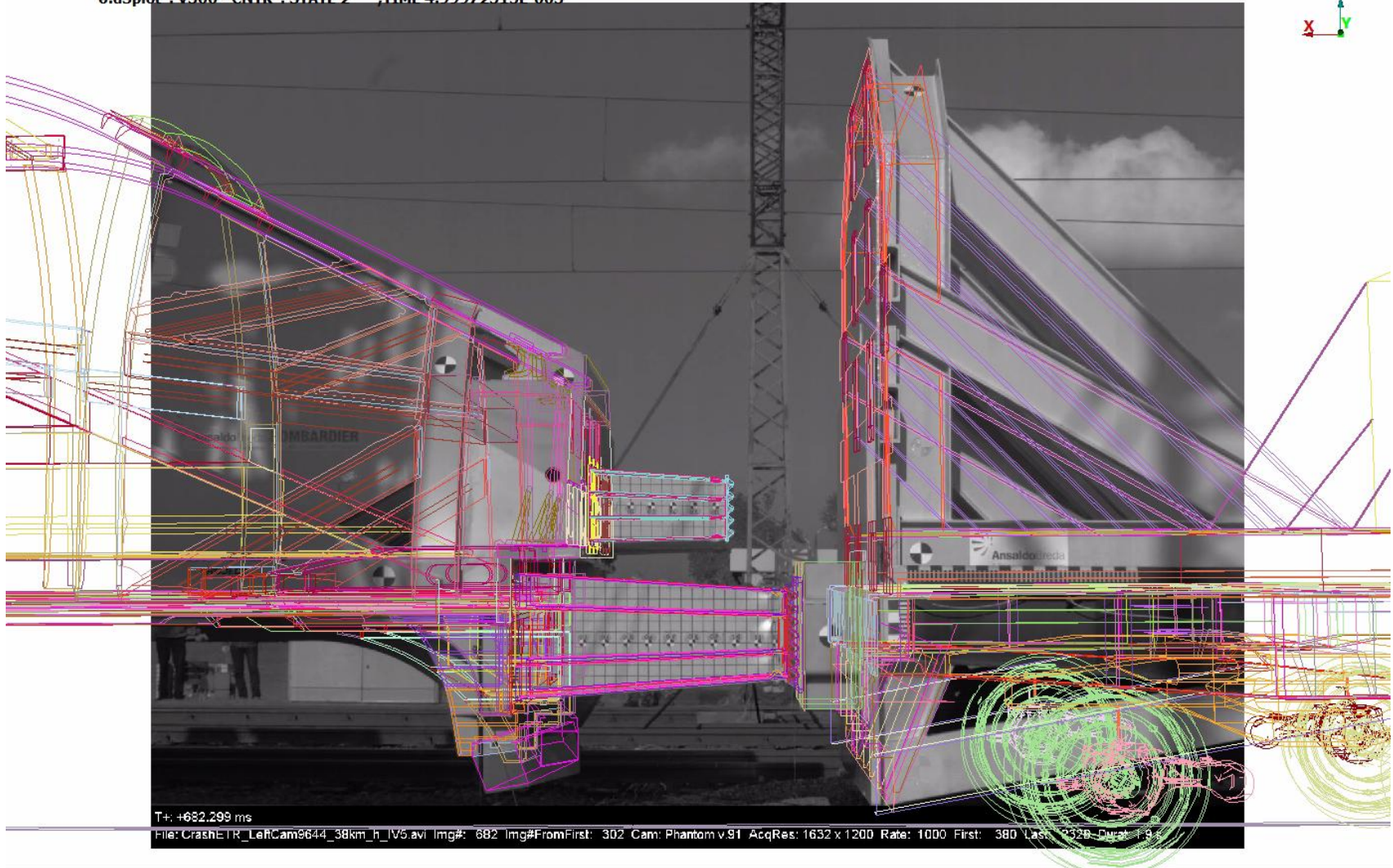


Confronto tra FEA e test full scale



Sicurezza passiva

0:d3plot : V300 - CNTK : STATE 2 , TIME 4.99972515E-003

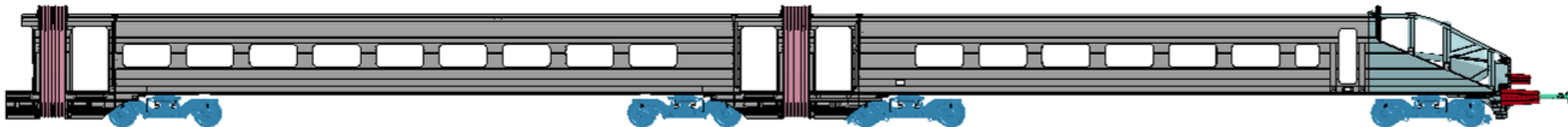




SICUREZZA PASSIVA

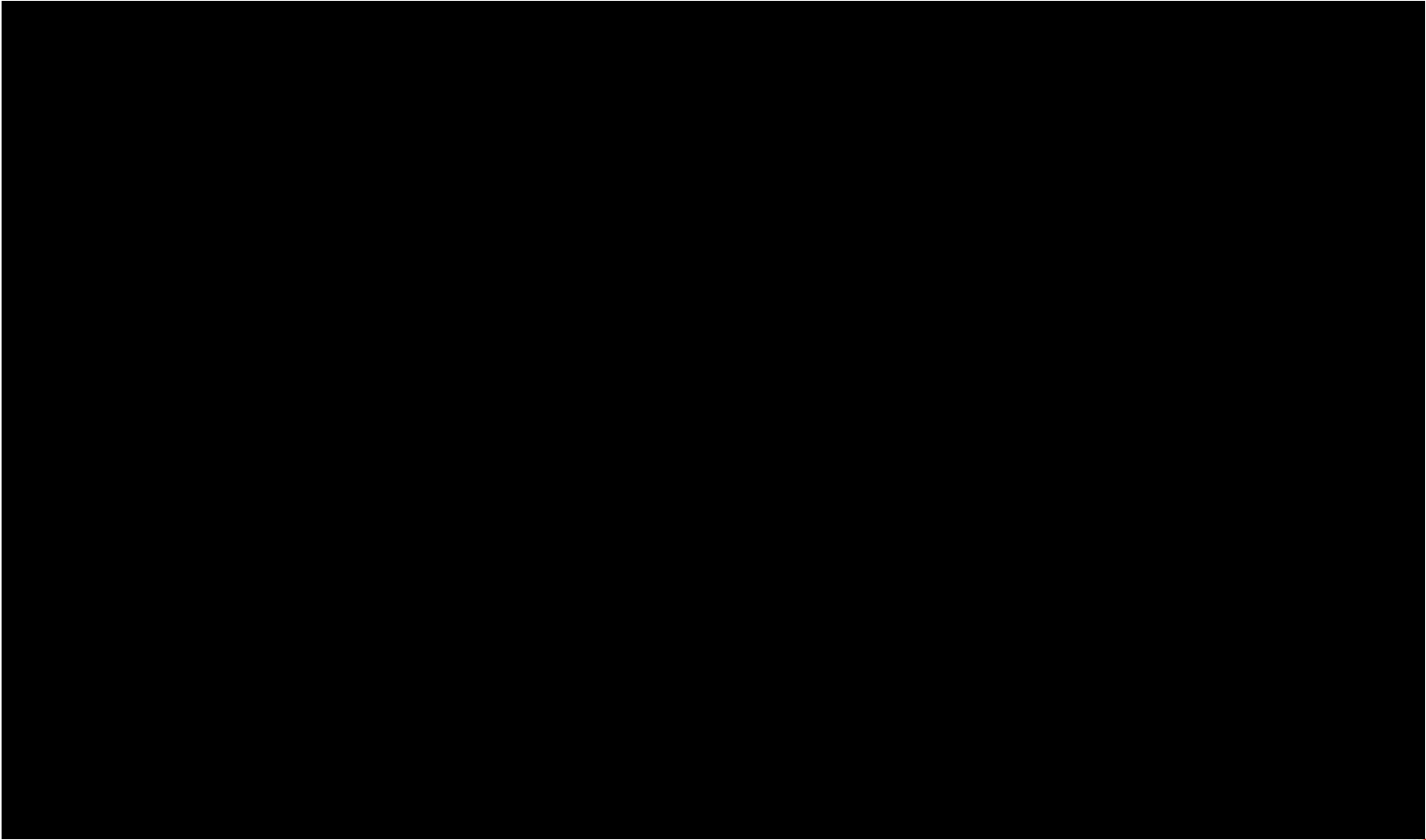
Table 2 — Collision scenarios and collision obstacles

Design collision scenario	Collision obstacle	Operational characteristics of requirement	Collision Speed - km/h				Collision partner and conditions
			C-I	C-II	C-III	C-IV	
1	Identical train unit	All systems	36	25	25	15	Identical train unit
2	80 t wagon	Mixed traffic with vehicles equipped with side buffers.	36	n.a.	25	n.a.	See C.1 for wagon specification
	129 t regional train	Mixed traffic with vehicles with a central coupler	n.a.	n.a.	10	n.a.	See C.2 for representation of regional train
3	15 t deformable obstacle	TEN and similar operation with level crossings	$V_k - 50$ ≤ 110	n.a.	25	n.a.	See C.3 for representation of large obstacle
	3 t rigid obstacle	Urban line not isolated from the road traffic	n.a.	n.a.	n.a.	25	See C.4 for representation of obstacle
4	Small, low obstacle	Obstacle deflector requirements to be achieved	See Table 3	n.a.	See Table 3	n.a.	See also 6.5





Scenario 1





Scenario 2



Scenario 3



Scenario 4

Strategia per installare i sistemi di segnalamento richiesti

Frecciarossa 1000 è stato progettato per operare in Italia e in 7 paesi europei:

Italia		(ETCS, SCMT)
Germania		(ETCS, LZB/PZB)
Belgio		(ETCS, TBL1,TBL2, Memor)
Francia		(ETCS, TVM, KVB, “Crocodile”)
Svizzera		(ETCS, ZUB)
Spagna		(ETCS, LZB/PZB)
Austria		(ETCS, LZB/PZB)
Olanda		(ETCS, ATB)

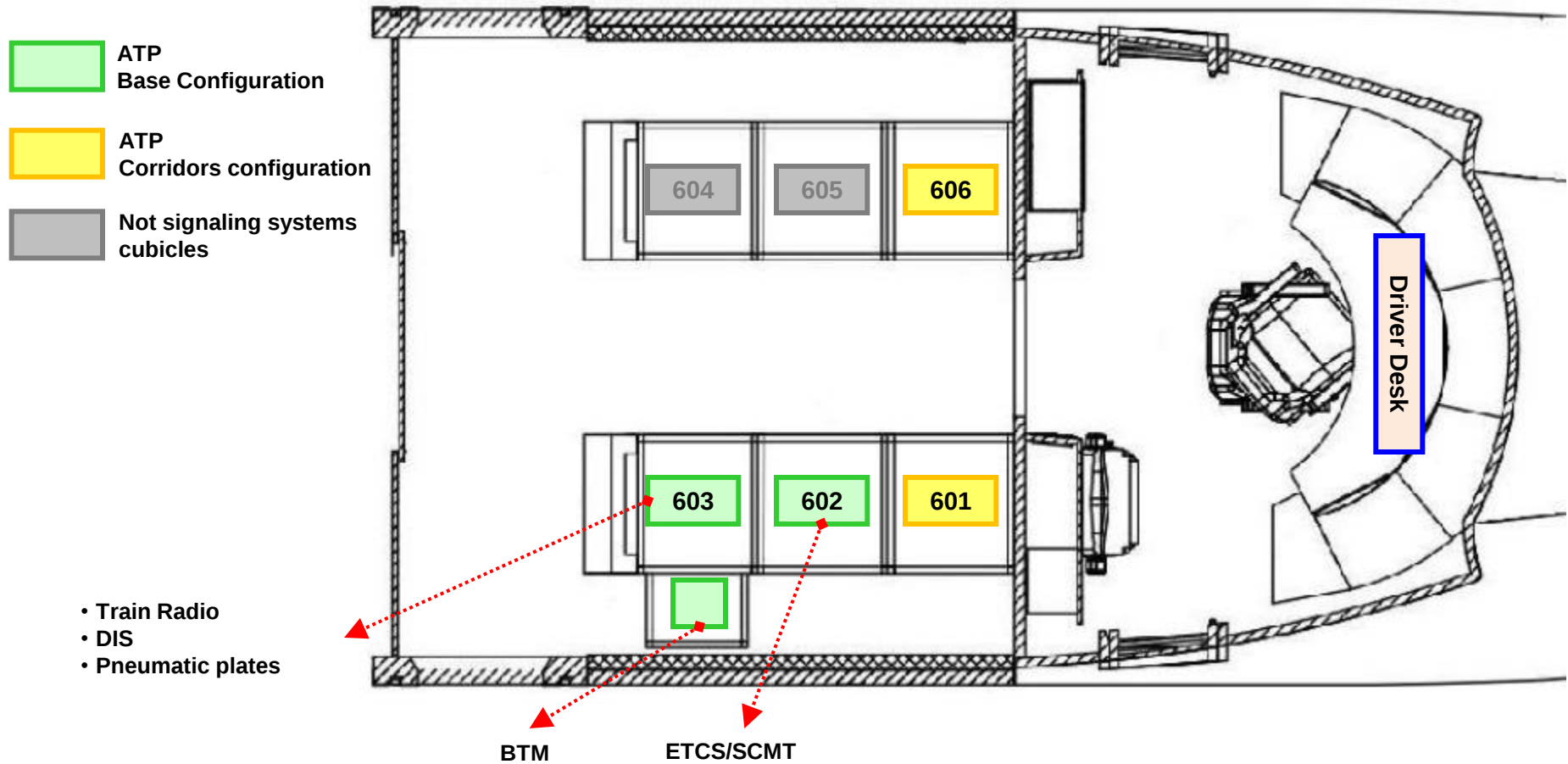


Strategia per installare i sistemi di segnalamento richiesti

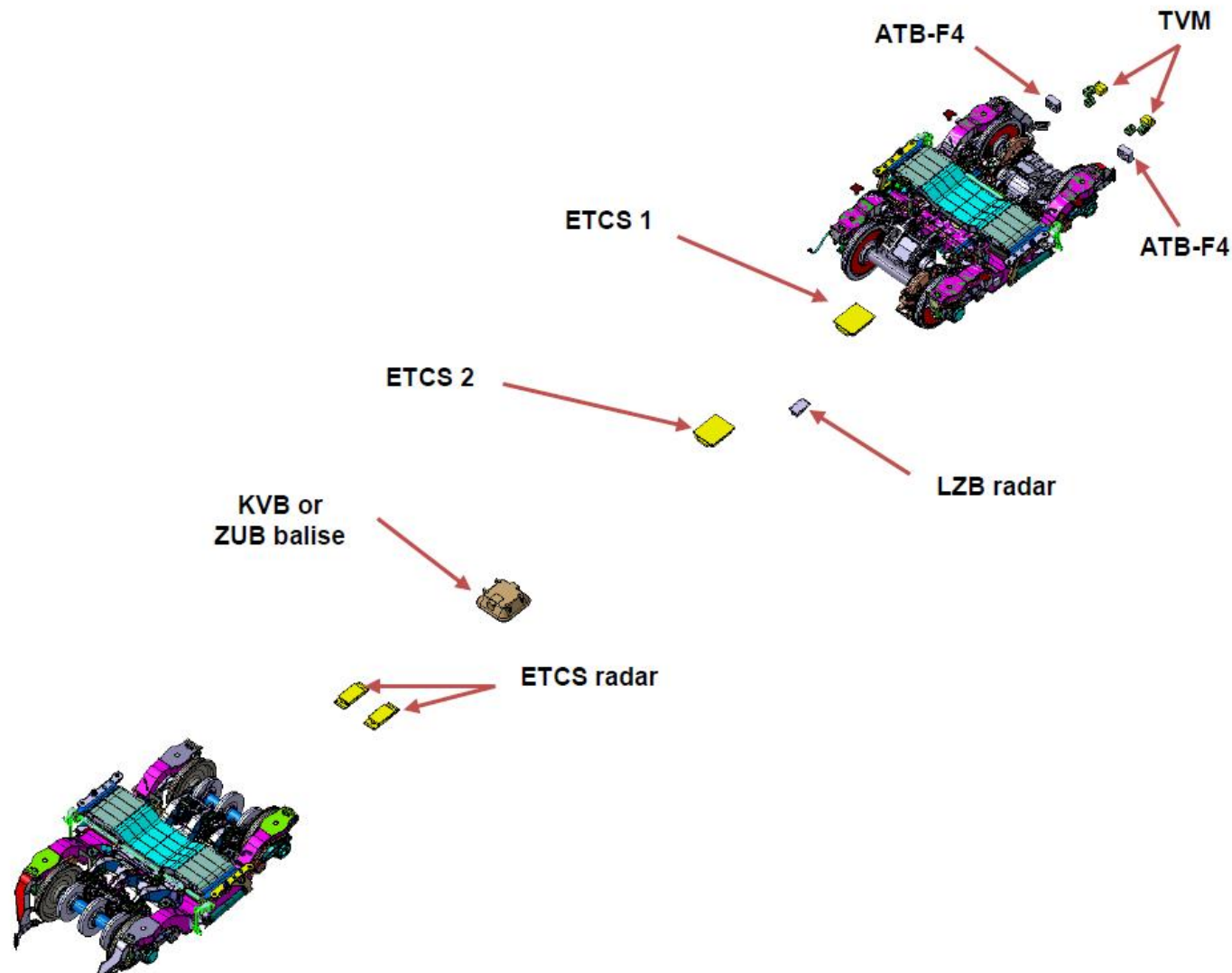
I sistemi di segnalamento sono stati raggruppati in «corridoi»

- Italia – Francia
- Italia - Francia – Belgio
- Italia – Francia – Spagna
- Italia – Austria – Germania
- Italia – Svizzera – Germania
- Italia – Austria – Svizzera – Germania
- Francia – Belgio – Olanda– Germania

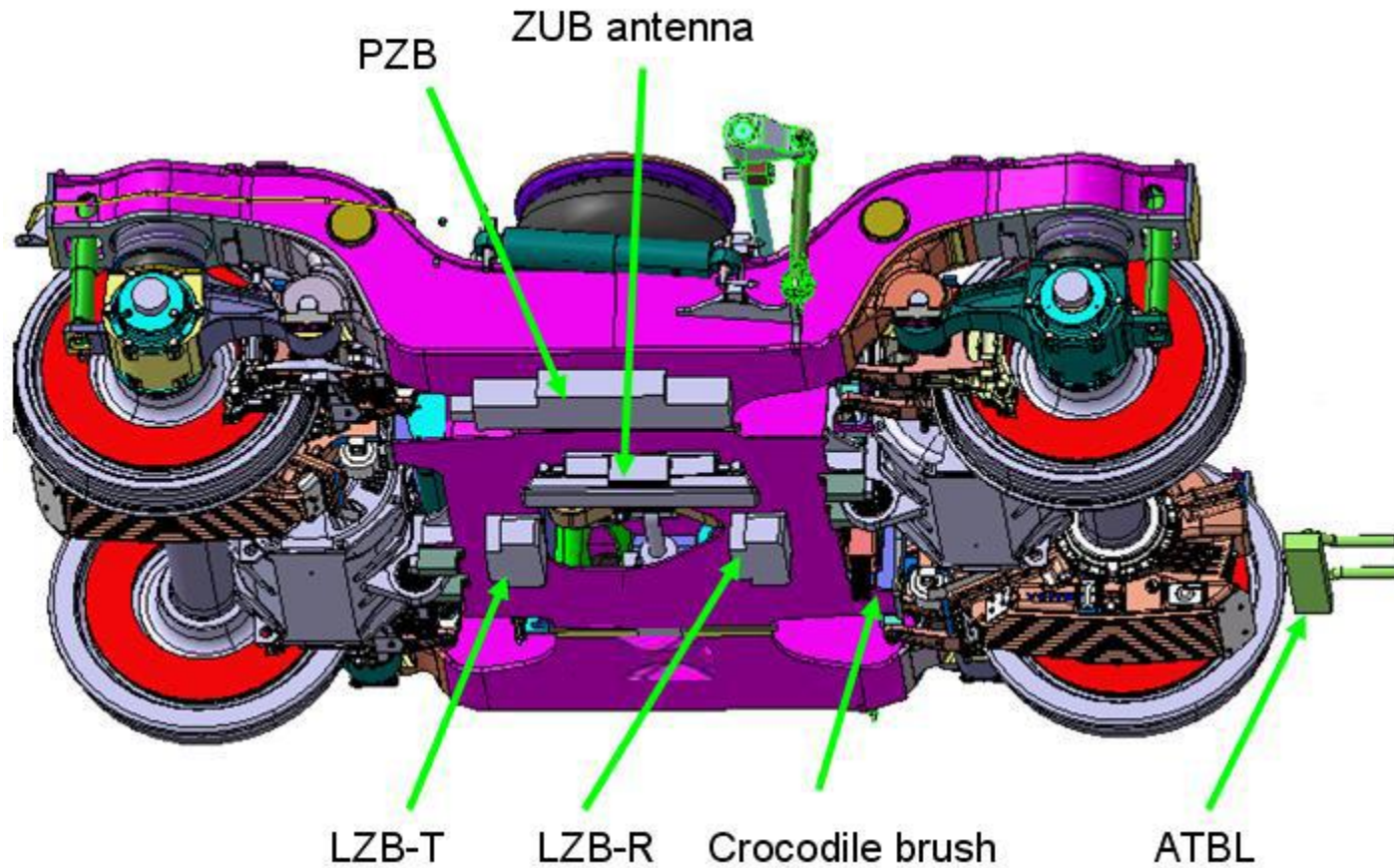
Sistemi di segnalamento – disposizione nell'isola elettronica



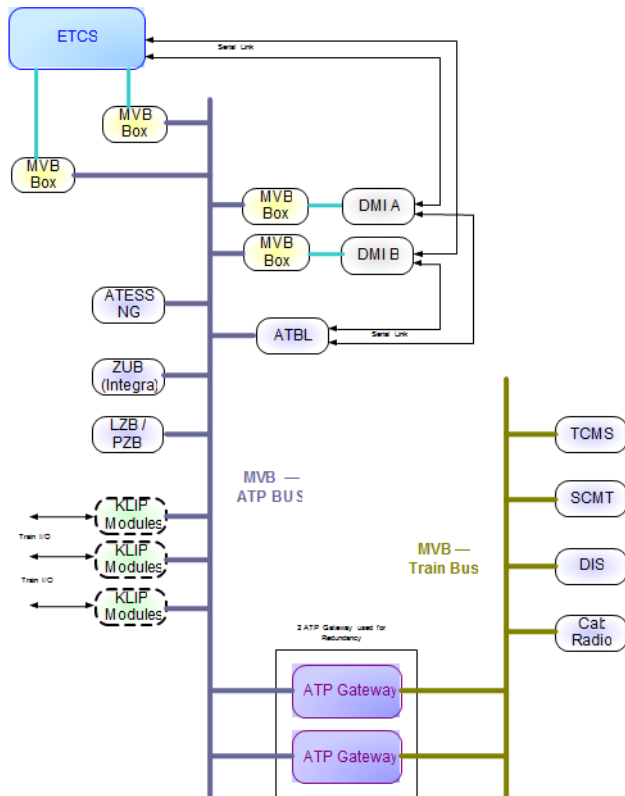
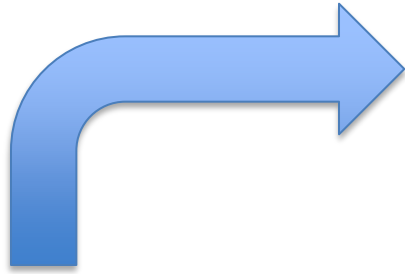
Sistemi di segnalamento – disposizione antenne sottocassa



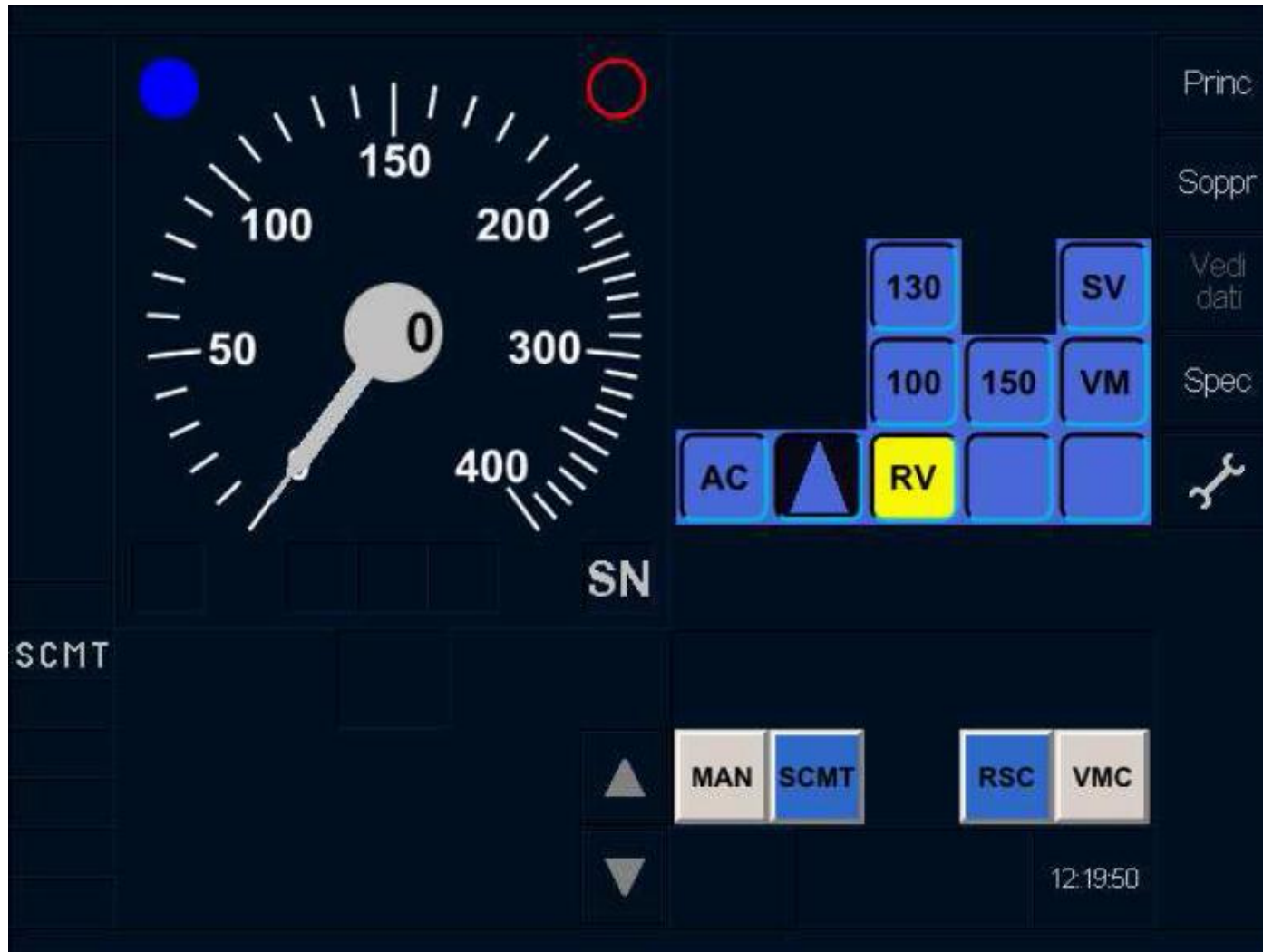
Sistemi di segnalamento – disposizione antenne sul carrello



Sistemi di segnalamento – ottimizzazione banco



Sistemi di segnalamento – DMI integrata



Impatto ambientale e sostenibilità, primo treno alta velocità certificato EPD

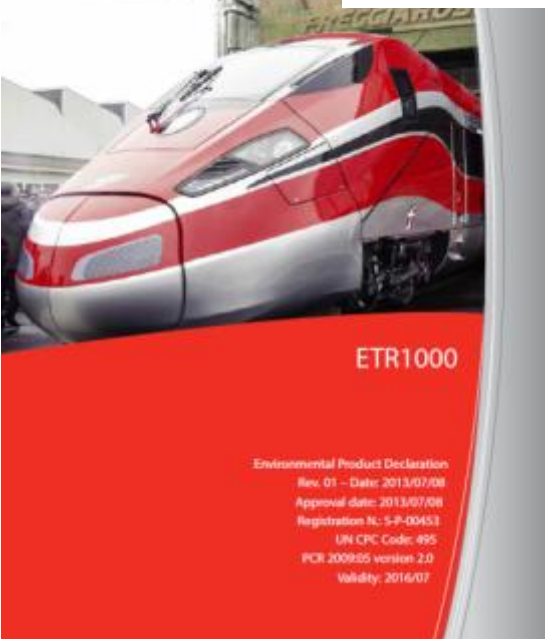
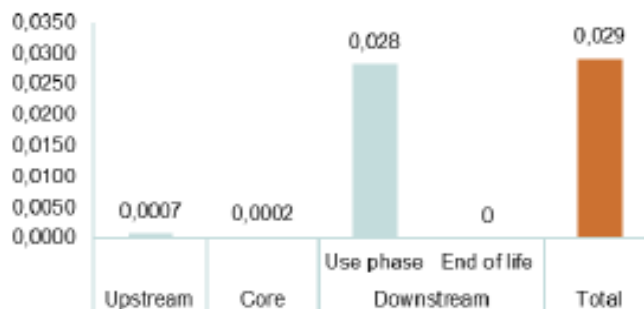
LCA e EPD

- LCA è una metodologia che consente la valutazione del potenziale impatto ambientale nell'intero ciclo di vita di un prodotto.
- Nell'LCA vengono quantificati per ogni fase i flussi di sostanze e prodotti in ingresso/uscita dal sistema
- EPD è la Environmental Product Declaration, dichiarazione su base volontaria simile alla "eco-labels" in uso su moltissimi prodotti della Unione Europea
- EPD si basa sui risultati dell'LCA in accordo alla norma ISO 14025



Impatto ambientale e sostenibilità, primo treno alta velocità certificato EPD

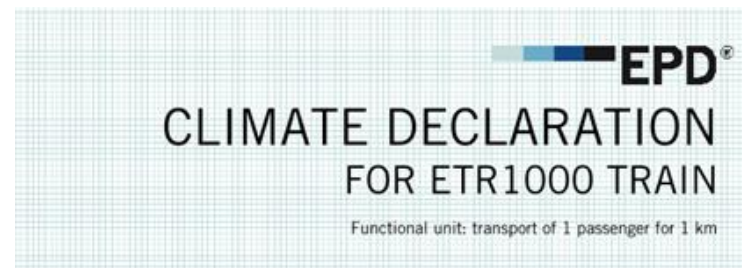
kg CO₂-equivalents per 1 passenger transport for 1 km



Riciclabilità 94.4%
 Recuperabilità 97%

Certificato da Swedish
 Environmental
 Council

www.environdec.com



The climate declaration shows the emissions of greenhouse gases, expressed as CO₂-equivalents. It is based on verified results from a lifecycle assessment (LCA) performed as basis for an EPD® (Environmental Product Declaration), in accordance with ISO 14025.

Product

ETR 1000 is a "very high speed" train for passengers' transport, EMU (Electric Multiple Units) type, designed and produced in collaboration with Bombardier Transportation to improve the link between greater cities. The train consists of eight car bodies with seven articulations. The traction is supplied by sixteen electric engines, coupled on eight of the sixteen bogies; other trucks are only trailers.

Company

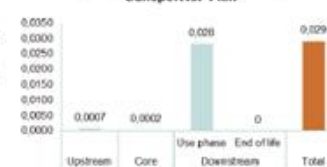
AnsaldoBreda S.p.A. is a Finmeccanica Group's company, specialized in the production of rail vehicles. AnsaldoBreda is organized in its four Italian plants: Naples, Pistoia, Reggio Calabria and Palermo and in some operating plants abroad, achieving an overall number of about 2,250 employees.

The company has developed and certified an Environmental Management System in compliance with ISO 14001 standard.

Climate declaration

The environmental performance of the considered product has been quantified by Life Cycle Assessment (LCA) approach in accordance with ISO 14040 and ISO 14044. The life cycle is divided into three modules: Upstream Module (raw and basic materials, fuels etc) Core Module (manufacture of the vehicle) and downstream module (operation, materials etc). The graph shows the emissions of greenhouse gases for passenger transports per person and kilometre.

kg CO₂-equivalents per 1 passenger transport for 1 km



Other environmental information

More information about the products complete environmental performance is presented in the EPD at www.environdec.com.

Contact

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 Tel +39 0573 370773
bonaffini.davide@ansaldobreda.it



LINK TO MORE INFORMATION: WWW.ENVIRONDEC.COM		EPD PROGRAMME: THE INTERNATIONAL EPD SYSTEM	
REGISTRATION NO. S-P-00453	PCR: 2009:05, V2.0	FOR REVIEW CONDUCTED BY: THE TECHNICAL COMMITTEE OF THE INTERNATIONAL EPD SYSTEM	
INDEPENDENT VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025: EXTERNAL VERIFIER: ARIANNA DEL ROSARIO		ACCREDITED / APPROVED BY: INTERNATIONAL EPD SYSTEM	
CLIMATE DECLARATIONS FROM DIFFERENT PROGRAMS MAY NOT BE COMPARABLE			
READ MORE ABOUT CLIMATE DECLARATIONS AT: WWW.CLIMATEDEC.COM			
VALIDITY: 2016/07-19			



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