

Eurailspeed

Parallel Session F.1

Roberto Rinaldi

**Technical and Product Director Main Line
Alstom Transport**



Under the patronage of



Organisers



Partners



Media partner



November 2005

ALSTOM

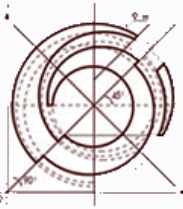
EurailSpeed 2005

Roberto Rinaldi

Technical and Product Director

High Speed Rail and the Environment

ALSTOM



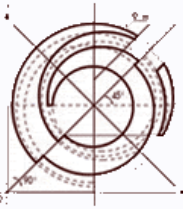
Eco Design



*Systemic approach to design **friendly for environment products***

To design products conform to customers expectations and reducing environmental impact on its life cycle

www.transport.alstom.com



PRODUCT APPROACH

ALSTOM

Aspects/Impacts/requirements

Aspects

- Noise emissions
- Energy consumption and efficiency
- EMC
- Fluids and particules emissions
- Materials and assembly

Impacts

- Global Warming
- Ozone Layer
- Photochemical Ozone creation
- Water Eutrophication
- Air toxicity
- Water toxicity
- Air acidification
- Water depletion
- Energy depletion
- Natural ressources depletion
- Hazardous wastes production

Requirements

- Determination and/or target values on performance indicators
- LCA study
- ISO 14001 certification

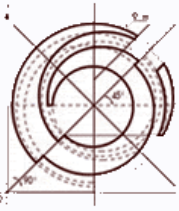
Requirements
Performance indicators



Upcoming UIC
fiche (leaflet),
(PROSPER)



LCA by EIME®

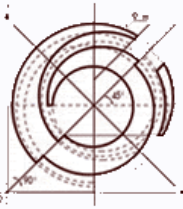


EU R&D Projects

- Aeroacoustic and rolling noise : DEUFRAKO,NOEMIE
- Environmental Performance Indicators: REPID
- Ecodesign: ECODIS

Ecodesign Tools in Alstom

- Specific tools for: Noise,Vibration,Aerodynamic,Energy consumption,Electro Magnetic Compatibility
- ALSTOM tool for Life Cycle Assessment : EIME®
(Environmental Information and Management Explorer)



PRODUCT APPROACH

ALSTOM

LIFE CYCLE



MANUFACTURING

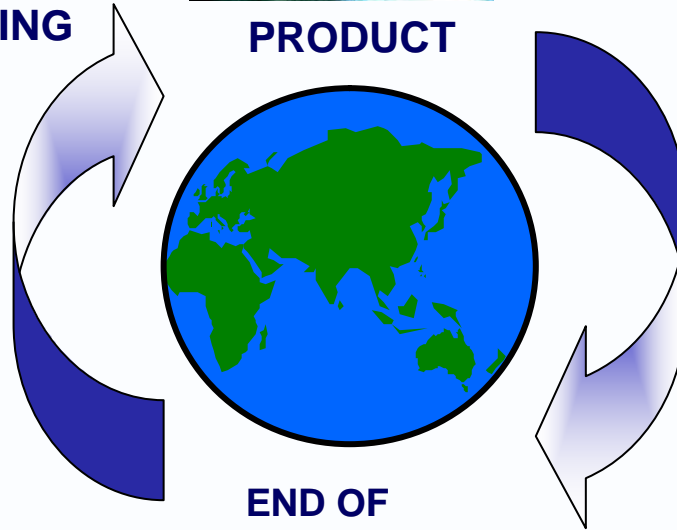


PRODUCT

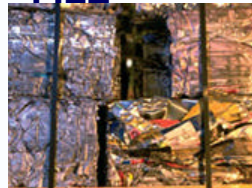
**USE
MAINTENANCE**



**MATERIALS
EXTRACTION**



END OF

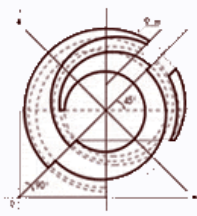


**RECOVERY
RECYCLING
DISPOSAL**

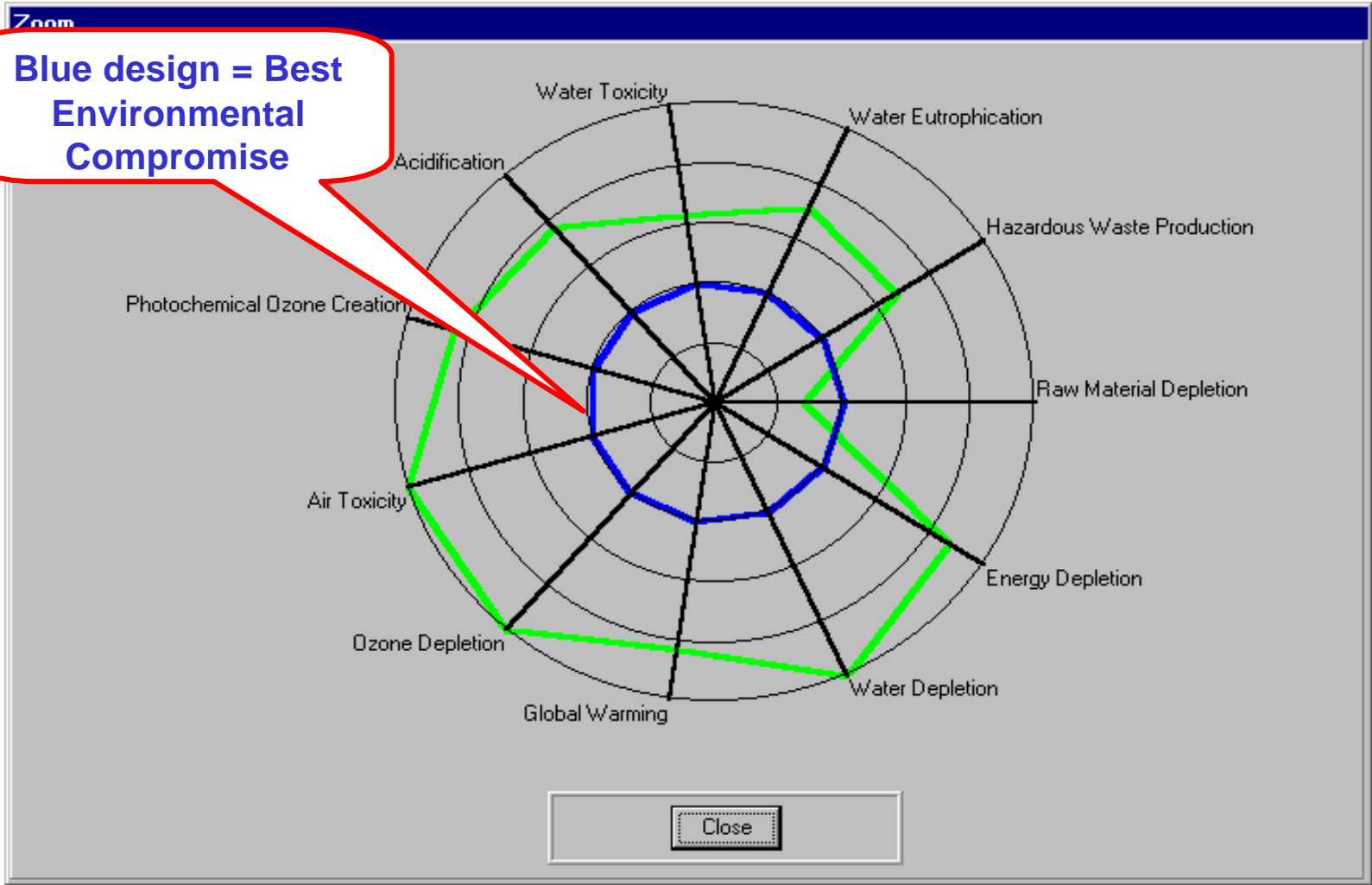
Environmental
Impact



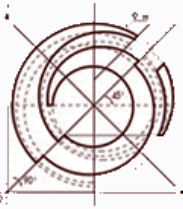
Impact
indicators
(performance
evaluation
Criteria)



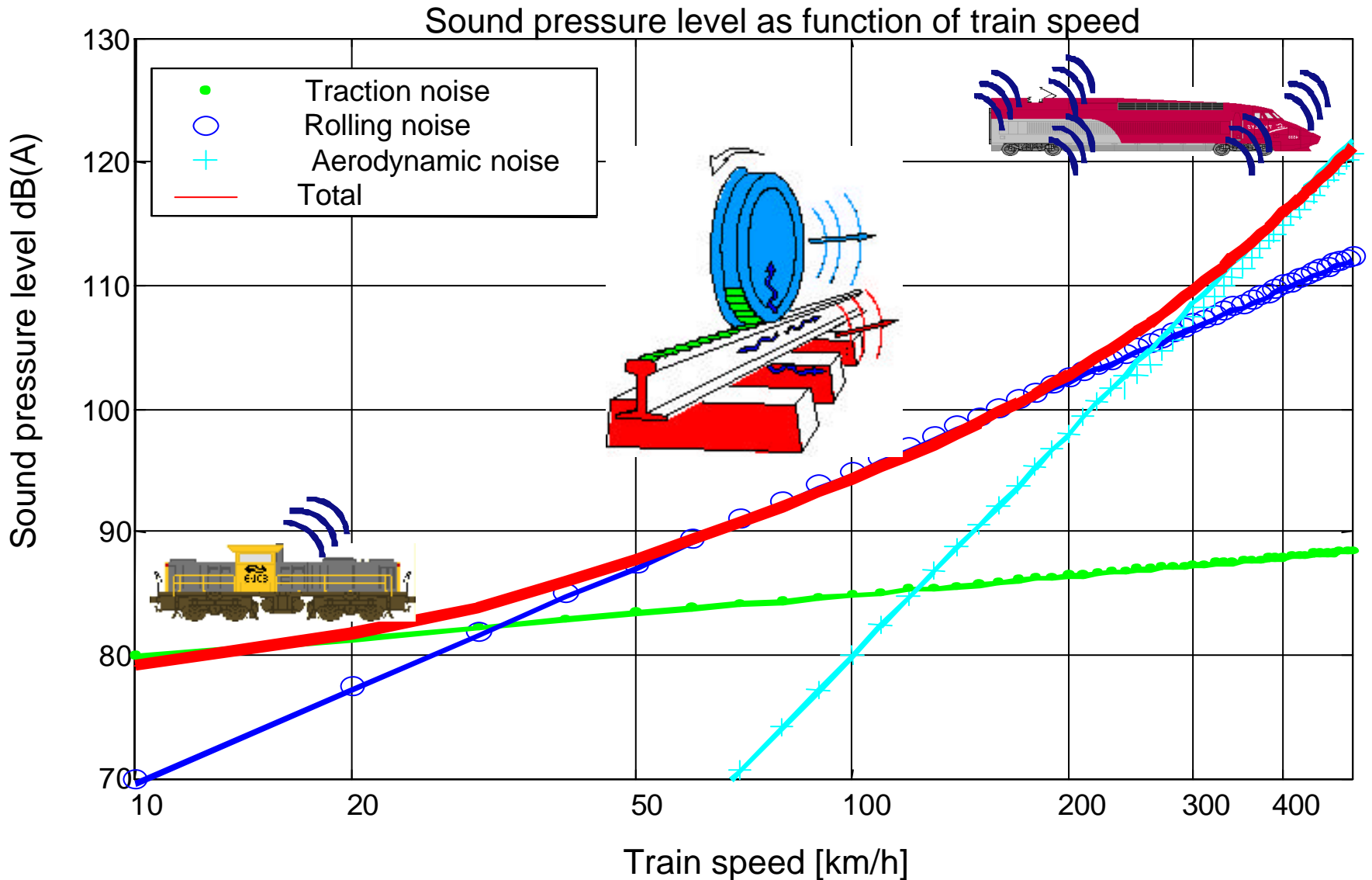
Blue design = Best Environmental Compromise

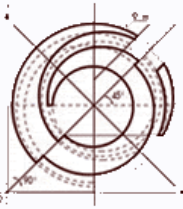


11 Environmental Impact indicators

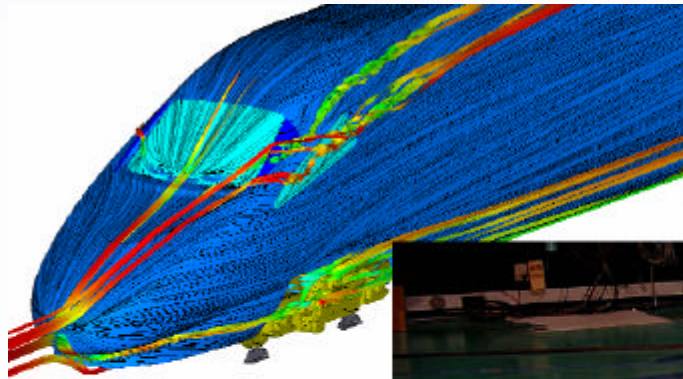


EXTERNAL NOISE: main sources



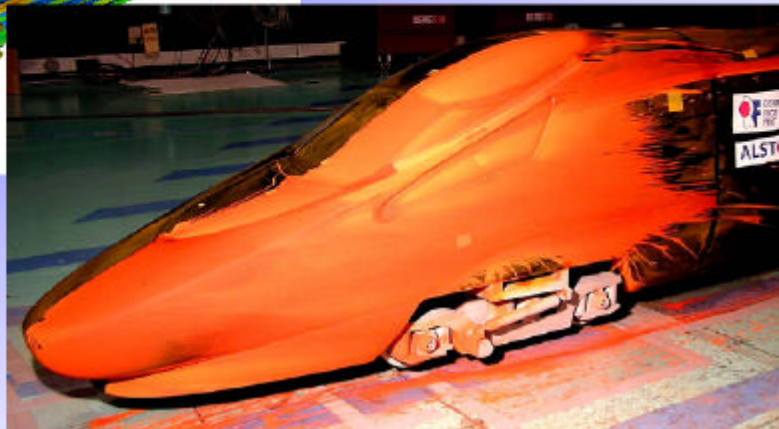


AEROACOUSTIC EVALUATION

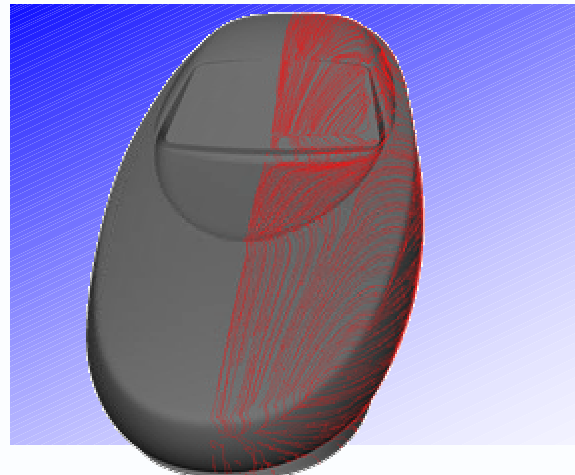


PowerFlow calculations
compare with

...wind tunnel tests

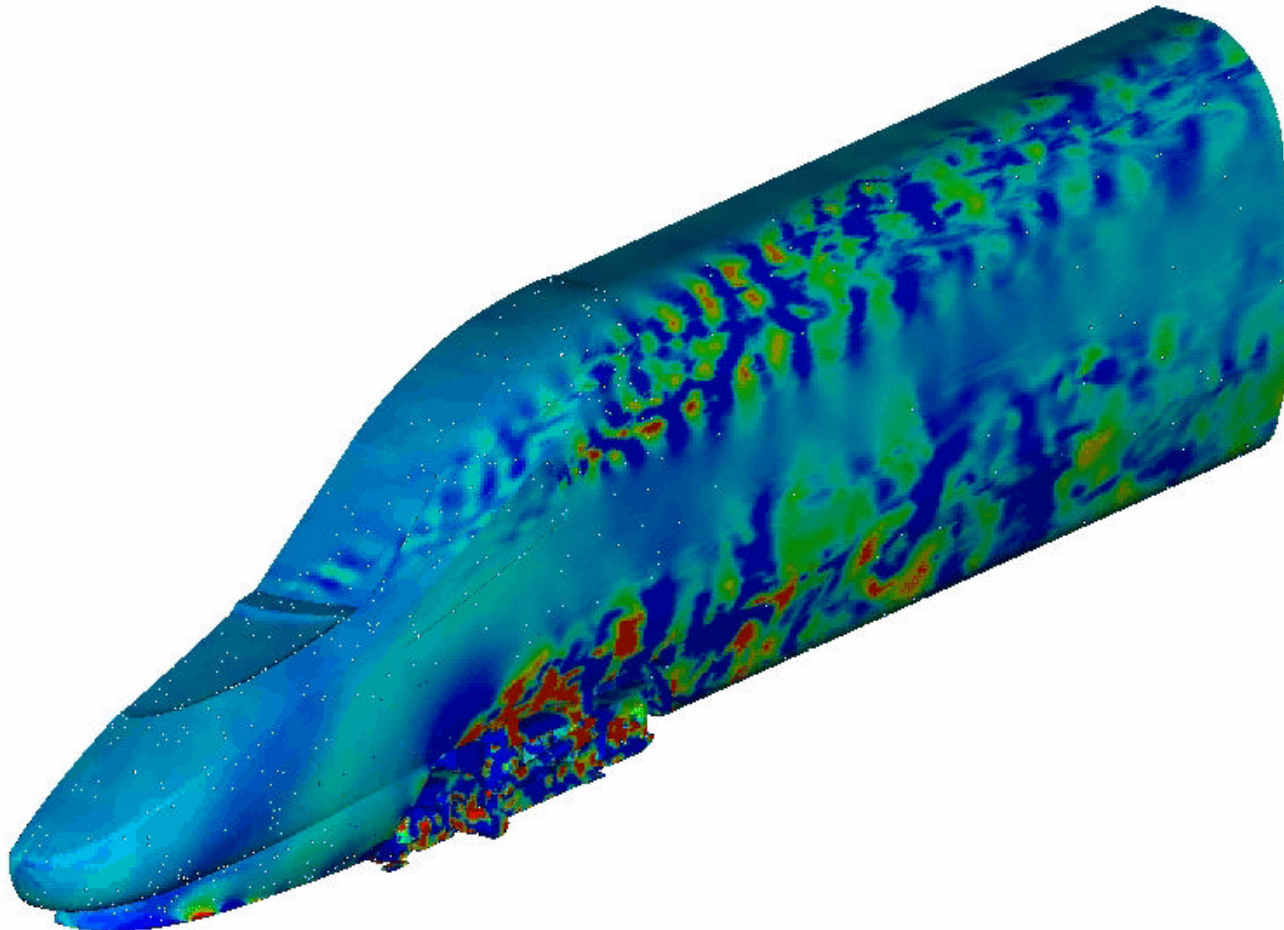


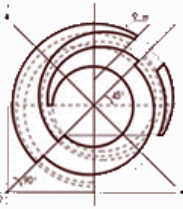
**Possible to predict
only by calculations**



AEROACOUSTIC EVALUATION

ALSTOM

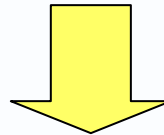




ENERGY CONSUMPTION

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- Weight reduction (g.e : bodyshell stucture in Alu Light Alloy and Composite)
- Aerodynamic performance
- Traction Equipment Efficiency

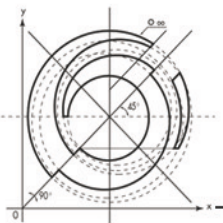


But also Train Configuration

Articulated Train vs. Conventional Train

- Overall weight reduction: more than 10% weigth reduction (Less Traction Power installed for the same specific power and for the same train length)
- Aerodynamic drag optimisation : less bogies for the same train length.

ENERGY CONSUMPTION



Plane

51.1



Private Car

29.9



Coach

18.3



Classic Train

17.6



TGV

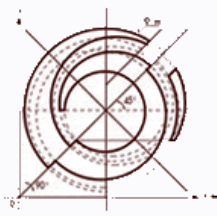
12.1



0 10 20 30 40 50 60

"Petroleum equivalent gramme" per passenger-kilometre

Source : SNCF-I



OUR COMMITMENT:

**SAFE AND FRIENDLY FOR ENVIRONMENT
PRODUCTS**



The logo for Alstom, featuring the word "ALSTOM" in a bold, sans-serif font. The letters "A", "L", "S", "T", and "M" are dark blue, while the letter "O" is red and stylized as a circle with three concentric lines inside. The logo is centered on a white background that is partially framed by a large red arc on the left and top. The background of the entire image consists of vertical blue stripes of varying shades and some faint white curved lines.

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