

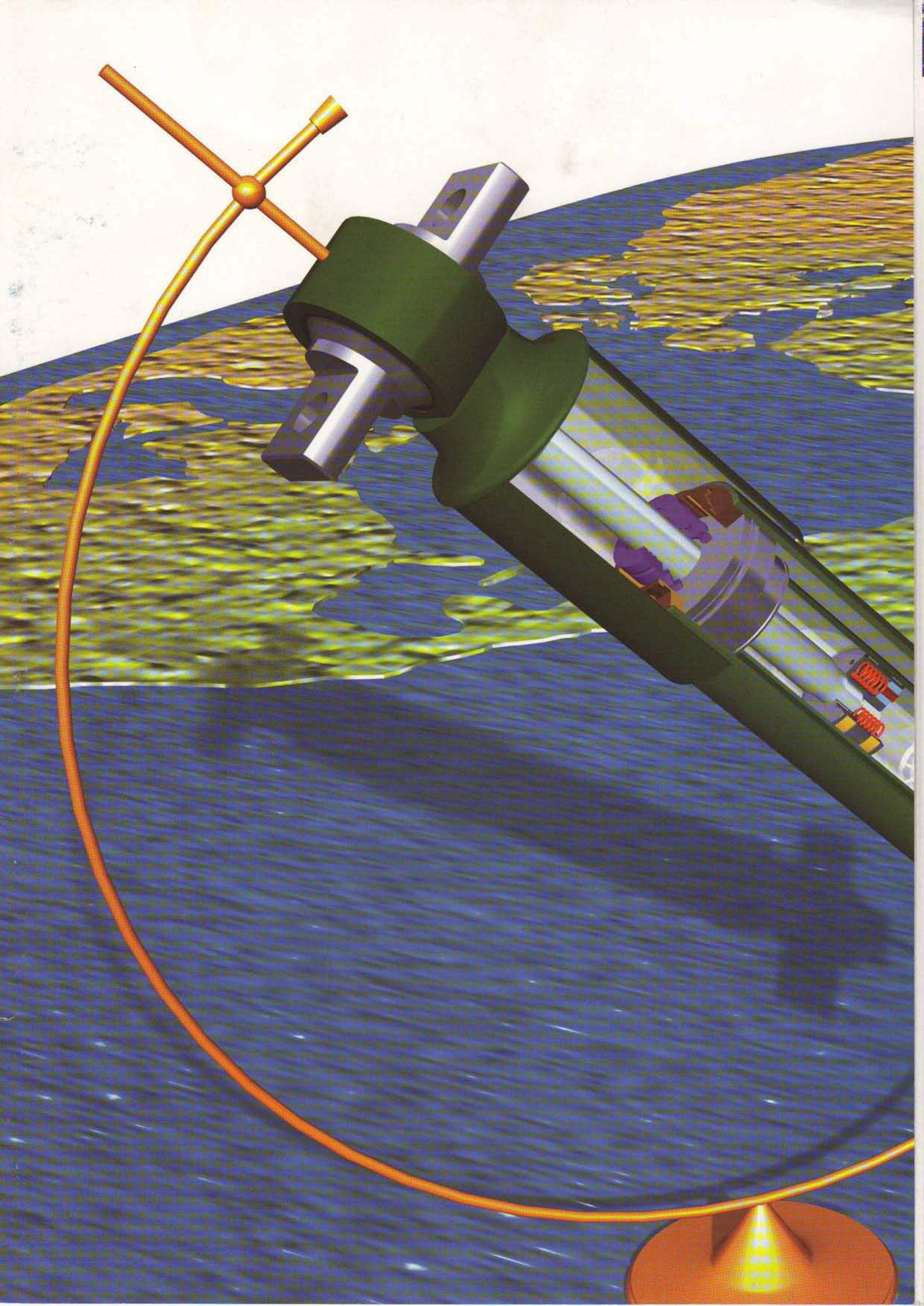


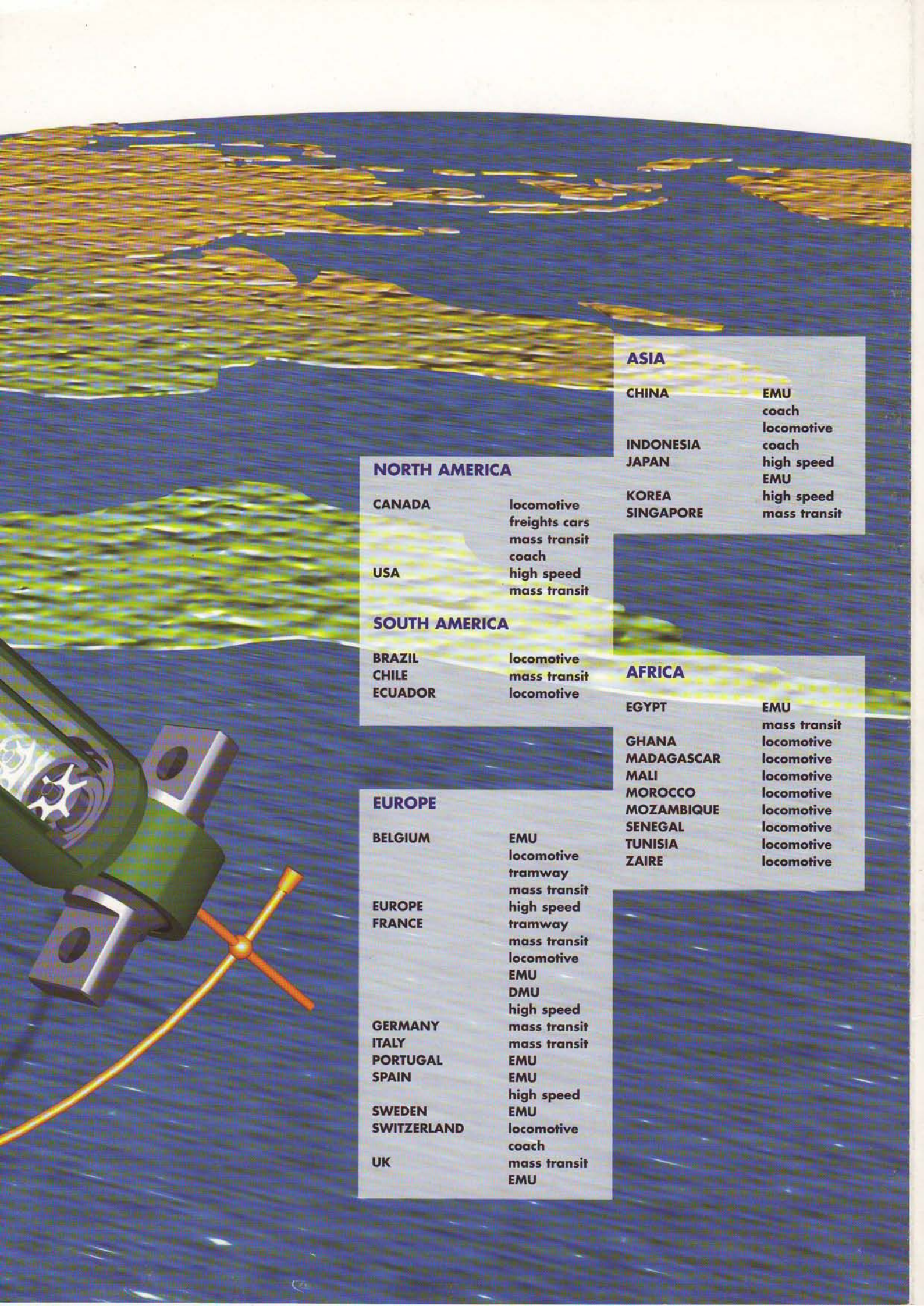
SIGRA

ROLLINGSTOCK COMPONENTS

DISPEN
Hydraulic Railway Dampers
The calming force

ALSTOM





ASIA

CHINA	EMU coach locomotive
INDONESIA	coach
JAPAN	high speed EMU
KOREA	high speed
SINGAPORE	mass transit

NORTH AMERICA

CANADA	locomotive freights cars mass transit coach
USA	high speed mass transit

SOUTH AMERICA

BRAZIL CHILE ECUADOR	locomotive mass transit locomotive
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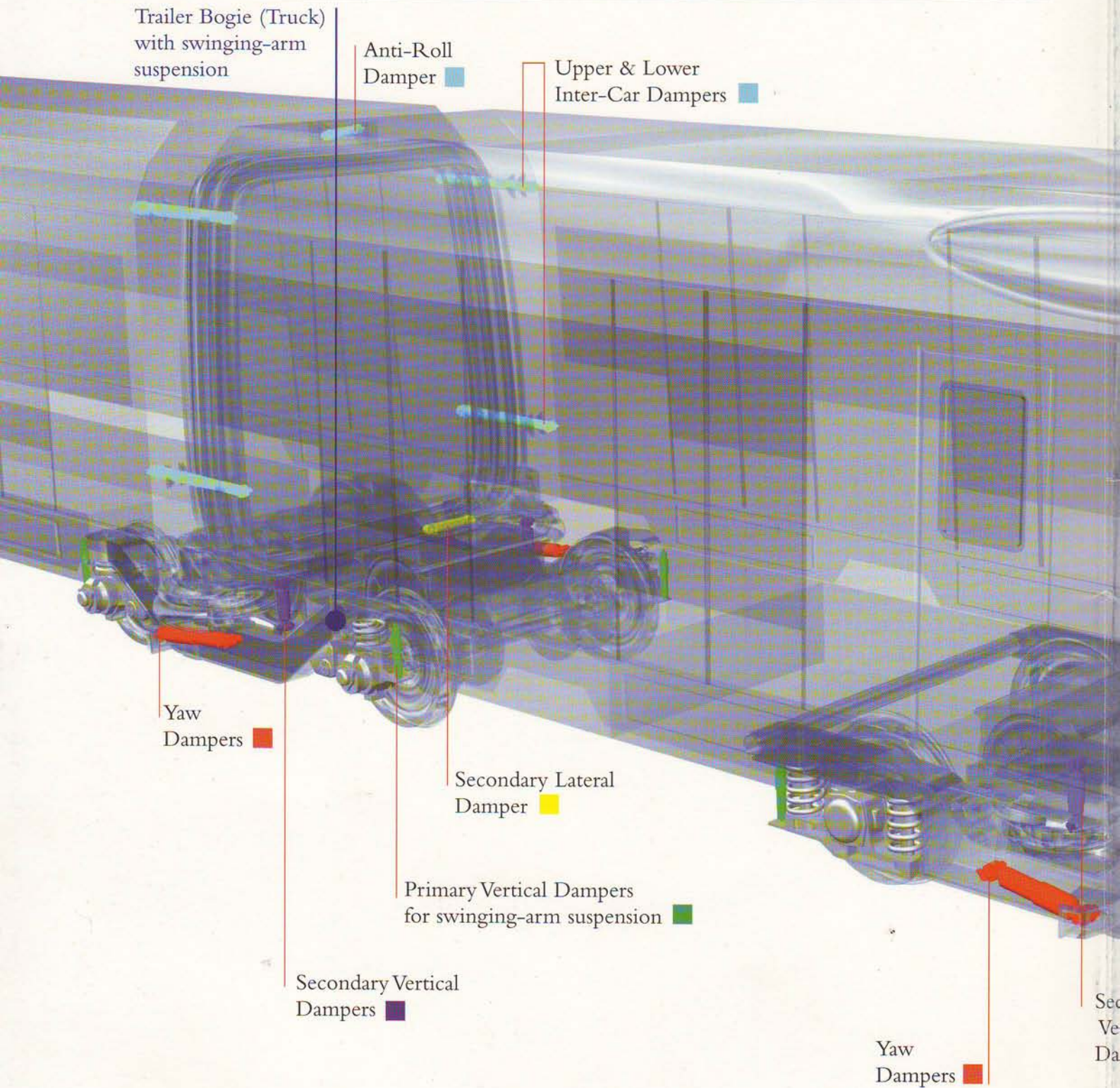
AFRICA

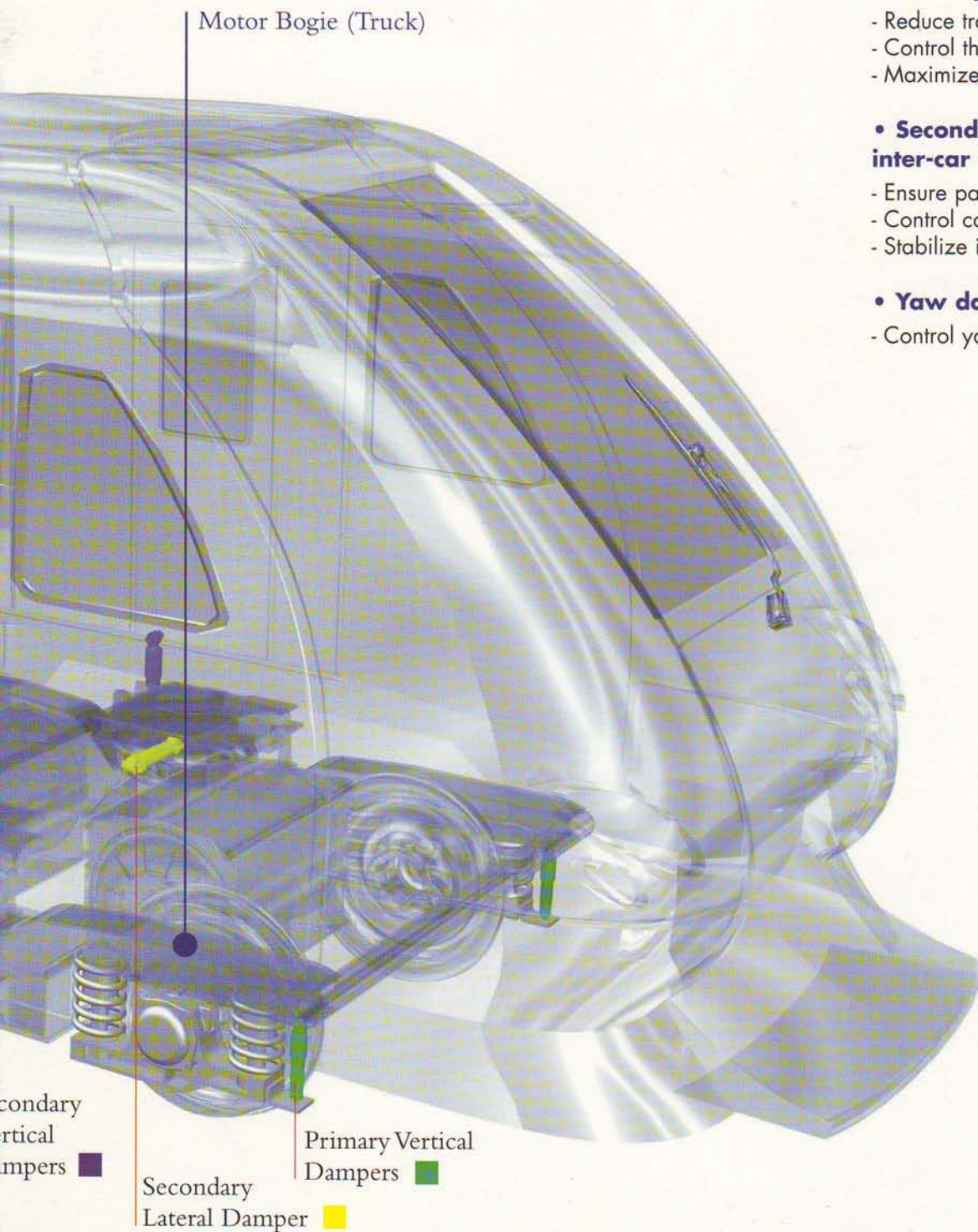
EGYPT	EMU mass transit
GHANA	locomotive
MADAGASCAR	locomotive
MALI	locomotive
MOROCCO	locomotive
MOZAMBIQUE	locomotive
SENEGAL	locomotive
TUNISIA	locomotive
ZAIRE	locomotive

EUROPE

BELGIUM	EMU locomotive tramway mass transit
EUROPE FRANCE	high speed tramway mass transit locomotive EMU DMU high speed
GERMANY ITALY PORTUGAL SPAIN	mass transit mass transit EMU EMU high speed
SWEDEN	EMU
SWITZERLAND	locomotive coach
UK	mass transit EMU

The calming force





Motor Bogie (Truck)

• **Primary suspension dampers**

- Reduce track defect vibration
- Control the pitch
- Maximize adhesion

• **Secondary suspension and inter-car dampers**

- Ensure passenger comfort
- Control car-body roll
- Stabilize inter-car movements

• **Yaw dampers**

- Control yaw motion at high speed

Secondary
Vertical
Dampers ■

Secondary
Lateral Damper ■

Primary Vertical
Dampers ■

DISPEN Hydraulic Railway Dampers

- **High-tech design experience built into a full range of railway damper applications**

- Each design combines the talents of highly experienced Bogie (Truck) engineers with those of the Car-builders.
- Train behaviour is verified by dynamic simulation.

- **Individual treatment of your operational conditions and requirements**

- Higher train speeds
- Differing track conditions
- Higher passenger expectations
- Lower operating costs with maintenance built into the initial design
- Maintenance support and service.

- **Each damper is calculated and tested to meet**

- The technical specification
- Comfort requirements
- Train performance and design
- Track quality specifications.

- **F.D.F.A.S. (Full Damping Force Activation System)**

- DISPEN's unique multivalve technology and **patented** compensation system allow us to respond to your specific damping force needs
- Bringing you the control you need (even with typical **railway** high frequency, low amplitude vibrations).

- **Increase security & stability**

- Improved Bogie (truck) behaviour from reduced pitch, yaw and roll
- Yaw dampers providing security at high speeds
- Primary dampers tailored to the bogie (truck) suspension system
- Longitudinal stability from high performance inter-car dampers.

- **Increased protection**

- Damping forces & performances maintained for longer
- Brakes and other vital **mechanical** bogie (truck) organs protected
- Vital **electronic** control systems protected through efficient limitation of vibration.

- **Increased comfort**

- Comfort performances maintained for longer though efficient vertical and lateral secondary dampers.

- **Patented anti-leak oil seals**

- Minimizing punctual interventions between **train maintenance steps**.

- **Long life and high reliability**

- Reduced number of wearing parts
- **minimized metal to metal contact** during normal operation.

- **Simplified maintenance from pre-assembled kits**

- Easily replaceable parts reduce maintenance times & costs
- Stocks of kits readily available & easily managed.

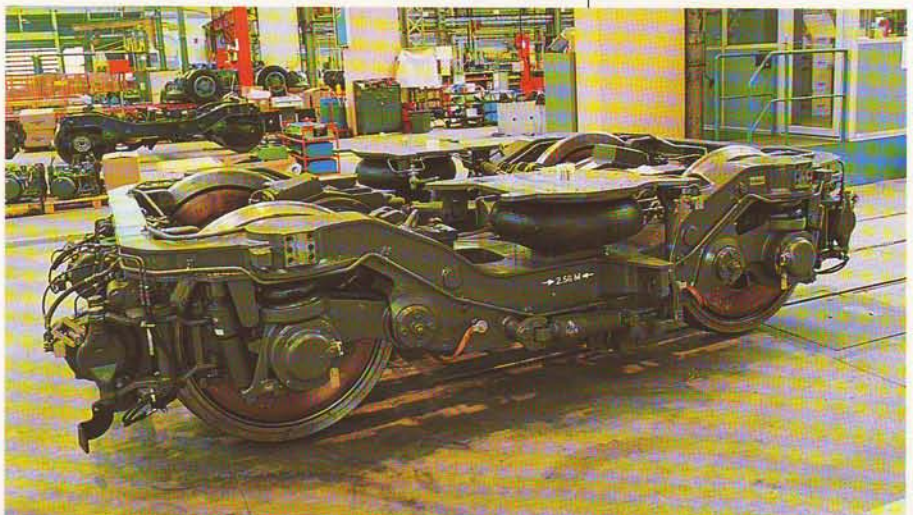
- **Continuous research and development**

- Proven and continuing solutions to everyday railway problems
- Close contact with operators and bogie designers
- Technical and after-sales support available world-wide
- Part of ALSTOM's center of excellence for bogies in Le Creusot.

- **International presence**

- World-wide ALSTOM sales network
- JV in Asia & technical co-operation in North America.

EMU Motor Bogie (Truck) fitted with DISPEN dampers



Mass Transit & LRT



Singapore

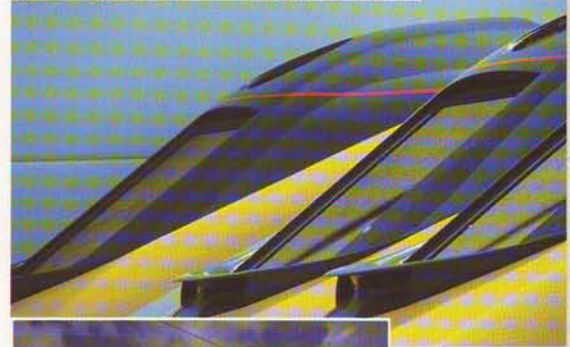


France

High Speed & Very High Speed



TGV Duplex



TGV Korea

TGV Eurostar

Locomotive & Coach



France



China

EMU & DMU



France



Sweden