

GANGWAY

PPS 2014 01 0610

We make it **possible**

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January 2014





Agenda

- ▶ **Introduction**
- ▶ Self Supported Gangway
- ▶ Light Railway Vehicle Gangway
- ▶ Hutchinson Capacities

Introduction

- ▶ Hutchinson has developed for more than 25 years several solutions as component or equipment supplier for passengers' communication between two consecutive railway vehicles
- ▶ Therefore Hutchinson is able to provide solutions for the complete range of passenger railway vehicles :
 - METRO
 - LRV
 - REGIONAL
 - HIGH SPEED

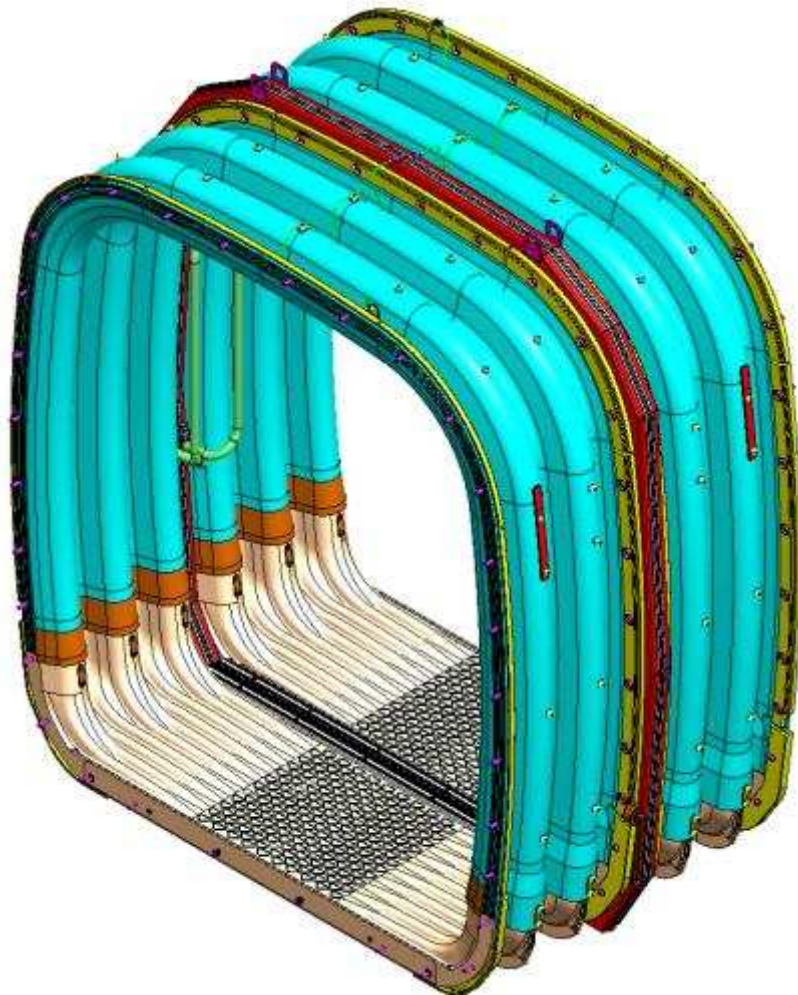




Agenda

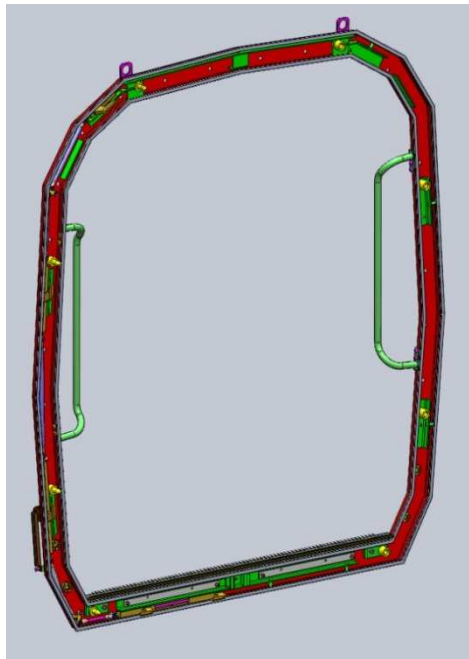
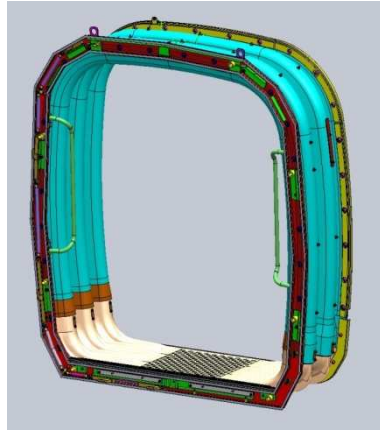
- ▶ Introduction
- ▶ **Self Supported Gangway**
- ▶ Light Railway Vehicle Gangway
- ▶ Hutchinson Capacities

Self supported Gangway 1200




Inter-car distance	1200 mm
Axial length	(2x600) mm
Total available Width (passenger area)	1770 mm
Total available Height (passenger area)	2050 mm
Weight	Less than 600 kg
Temperature Range	-25°C to + 40°C
Coefficient of thermal conduction of the rubber	Less than 2W/m²K
Global noise reduction following NF EN ISO 717-1.	Up to 36 dB
FIRE AND SMOKE TOXICITY	
Fire and Smoke toxicity: floor	NF F 16-101 M1 F4
Fire and Smoke toxicity: bellow walls	NF F 16-101 M2 F3
Fire and Smoke toxicity: canopy	NF F 16-101 M1 F3

Quick connecting middle frame




HUTCHINSON references

- ▶ Subcontractor :  **Faiveley**
TRANSPORT
- ▶ Application : **METRO**
- ▶ Product : **Bellows and floor**
- ▶ Inter-car distance : **1200 mm**
- ▶ **More than 20 years experience**
- ▶ Metro lines equipped :
 - Santiago de Chile
 - Valencia
 - Bilbao
 - Barcelona




HUTCHINSON references

- ▶ Country : FRANCE
- ▶ Car builder : **ALSTOM**
- ▶ Operator : 
- ▶ Application : **METRO**
- ▶ Project : **Paris MP89 - MP05**
- ▶ Product : **Complete Gangway**
- ▶ Inter-car distance : **1200 mm**
- ▶ **Partnership for existing and new rolling stock since 2004**
- ▶ Metro lines equipped : **line 1, 14**



HUTCHINSON references

- ▶ Country : SWISERLAND
- ▶ Car builder : ALSTOM
- ▶ Operator : 
- ▶ Application : METRO
- ▶ Project : Lausanne
- ▶ Product : Complete Gangway
- ▶ Inter-car distance : 1200 mm
- ▶ Quantity : 15 Gangways – 15 trains
- ▶ Metro line equipped : line M2

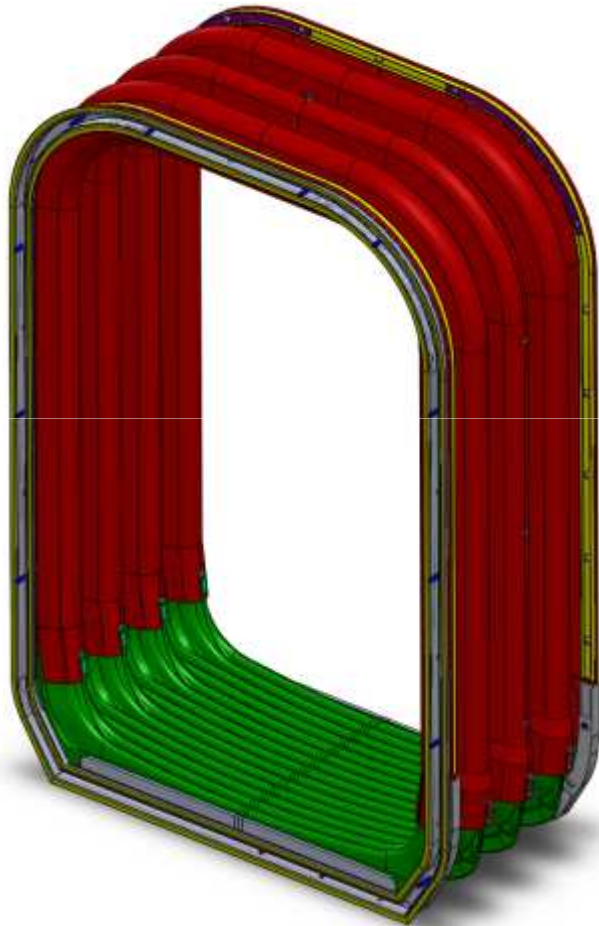


HUTCHINSON references

- ▶ Country : FRANCE
- ▶ Car builder : 
- ▶ Operator : Tunisian railway
- ▶ Application : TRAIN (metric gauge)
- ▶ Product : Complete Gangway
- ▶ Inter-car distance : 1200 mm
- ▶ Quantity : 10 gangways – 10 trains




Self supported 700



Inter-car distance	700 mm
Total available Width (passenger area)	1200 mm
Total available Height (passenger area)	1980 mm
Weight	Less than 220 kg
Temperature Range	-25°C to + 40°C
Coefficient of thermal conduction of the rubber	Less than 2W/m ² K
Global noise reduction following NF EN ISO 717-1.	Up to 36 dB
FIRE AND SMOKE TOXICITY	
Fire and Smoke toxicity: floor	NF F 16-101 M1 F4
Fire and Smoke toxicity: bellow walls	NF F 16-101 M2 F3
Fire and Smoke toxicity: canopy	NF F 16-101 M1 F3

HUTCHINSON references

- ▶ Country : MEXICO
- ▶ Car builder : **CAF** 
- ▶ Operator : STC Mexico city
- ▶ Application : METRO
- ▶ Product : Complete gangways
- ▶ Inter-car distance : 700 mm
- ▶ Quantity : 360 gangways – 45 trains
- ▶ Metro line equipped : line 2
- ▶ Last delivery was April 2006





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- ▶ **Light Railway Vehicle Gangway**
- ▶ Hutchinson Capacities

Light Railway Vehicle Gangway

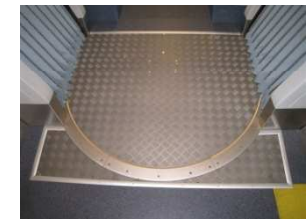
- ▶ Propose “the right enough innovative solution”
 - which differs from the existing solutions
 - which takes into account the customer needs

- ▶ Hutchinson has developed a modular product concept

- ▶ Propose a complete function

- Bellows equipped (stiffeners, skirt protection...)
- Connecting frames
- Floor, footplate, turntable
- Air duct

- ▶ Hutchinson master the entire production line from material to product





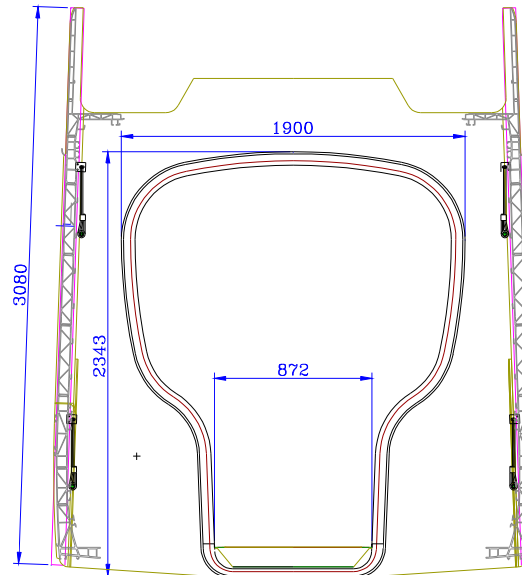
Light Railway Vehicle Gangway

- ▶ One-bloc bellows without sewing
- ▶ Hutchinson materials fully compliant with fire and smoke standards
 - NF-F 16101
 - DIN 5510
 - EN 45545
- ▶ Variation of colors available (inside / outside)
- ▶ Quick connecting frame can be proposed as option to improve assembly and disassembly times
- ▶ **All dimensional configurations can be proposed**



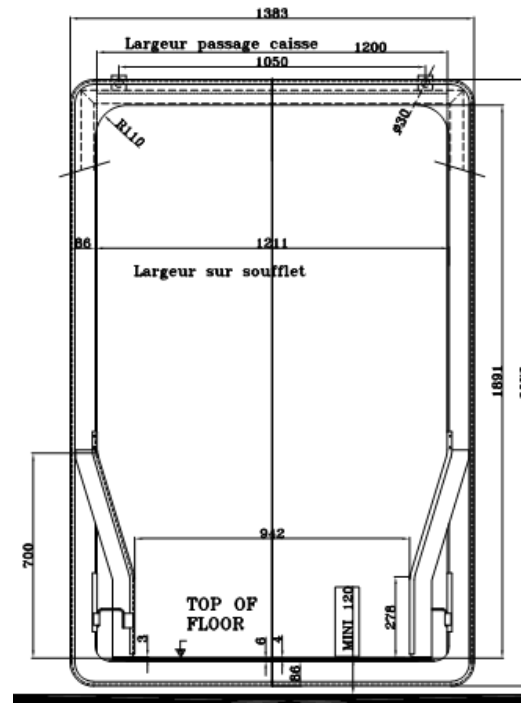
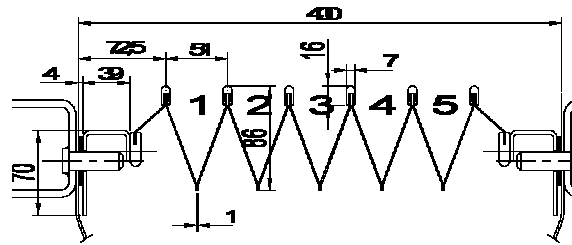
HUTCHINSON references

- ▶ Country : ITALY
- ▶ Car builder : **FIAT**
- ▶ Operator : GTT
- ▶ Application : TRAMWAY
- ▶ Project : Torino
- ▶ Product : **Closed bellows**
- ▶ Inter-car distance : 420 mm
- ▶ Quantity : 1 train – 6 gangways



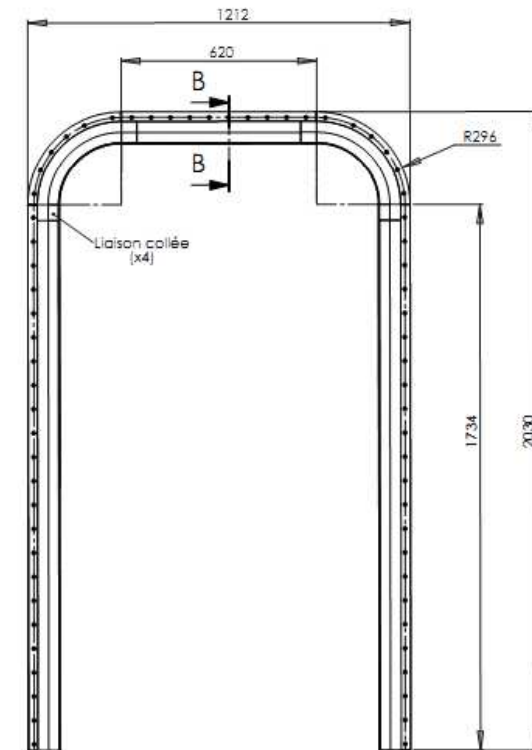
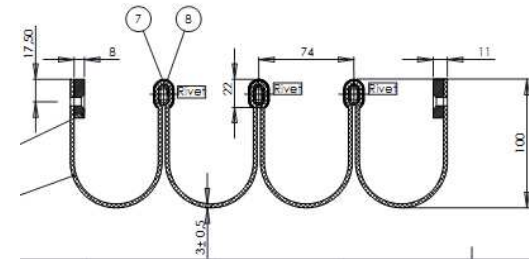
HUTCHINSON references

- ▶ Country : ROUMANIA
- ▶ Car builder : REMAR PASCANI
- ▶ Application : Intercity train
- ▶ Project : ACVILA
- ▶ Product : Double folding Gangways
- ▶ Inter-car distance : 400 mm
- ▶ Quantity : 15 sets



HUTCHINSON references

- ▶ Country : Democratic Republic of Congo
- ▶ Dealer: CIM
- ▶ Application : Intercity Train
- ▶ Product : U shape silicone gangway
- ▶ Inter-car distance : 300 mm
- ▶ Quantity : 80 gangways





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Material Tests



- ▶ Mechanical resistance
 - Hardness
 - Tensile strength
 - Accelerated aging



- ▶ Extreme conditions
 - High temperature resistance
 - Low temperature resistance



- ▶ Chemical resistance
 - Ozone resistance test
 - Cleaning agent test



- ▶ Ultra violet light resistance

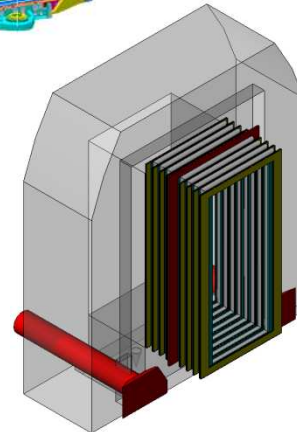
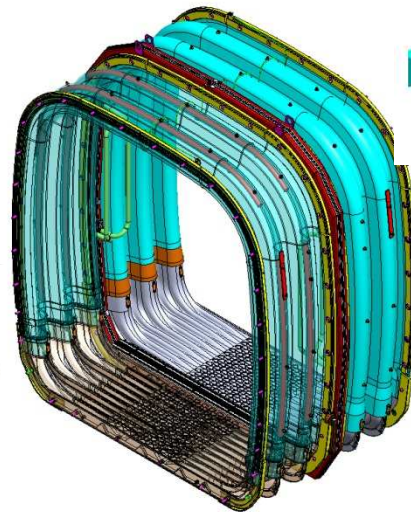
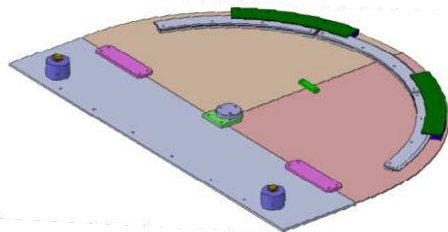
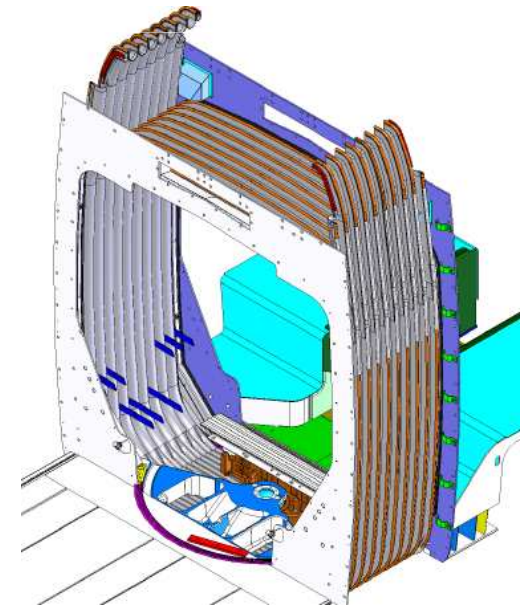
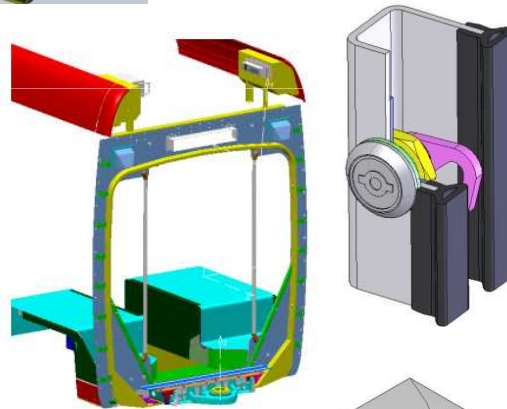
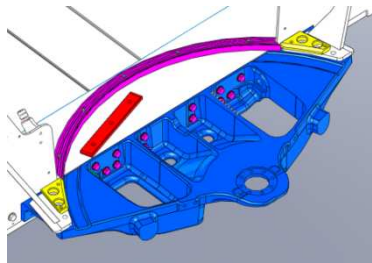
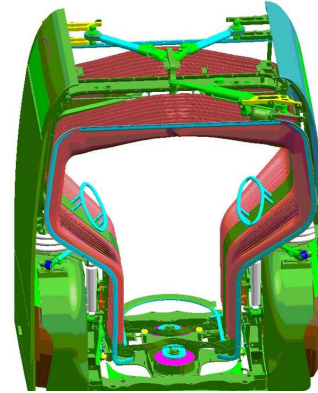
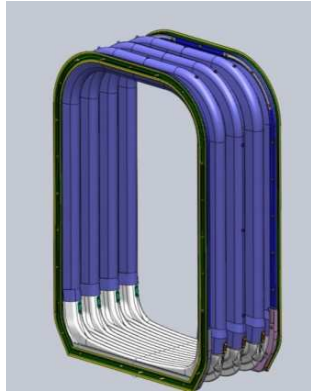
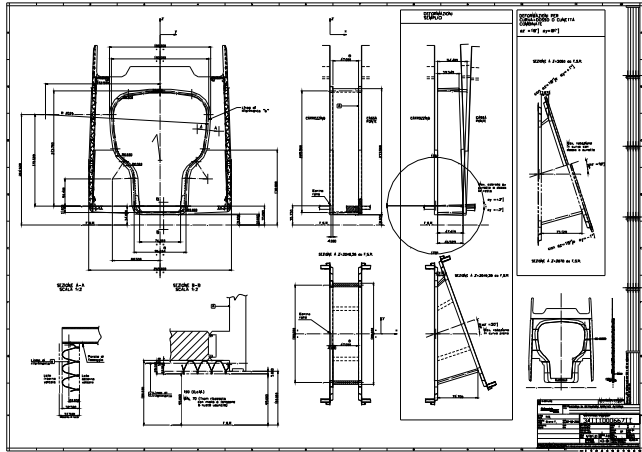


Fabric Tests

- ▶ Mechanical resistance
 - Tensile strength
 - Tear resistance
 - Friction
- ▶ Fire and smoke
 - NF F 16-101
 - DIN 5510
 - BS 6863
 - EN 45545
- ▶ Thermal insulation
- ▶ Vandalism
- ▶ Graffiti

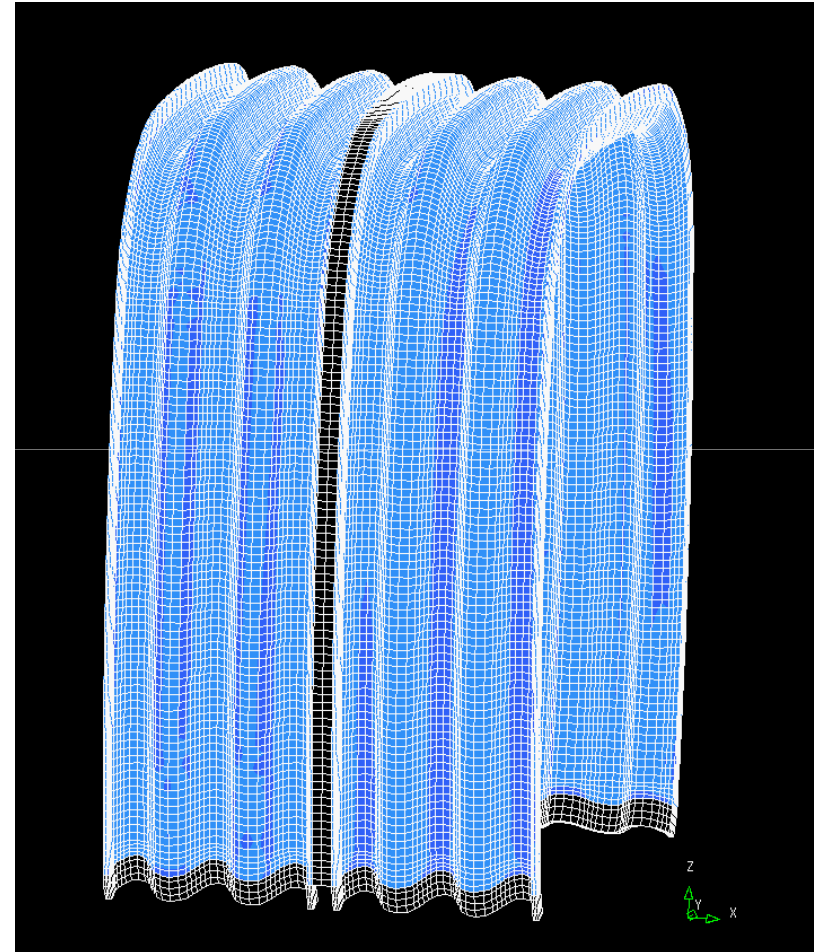
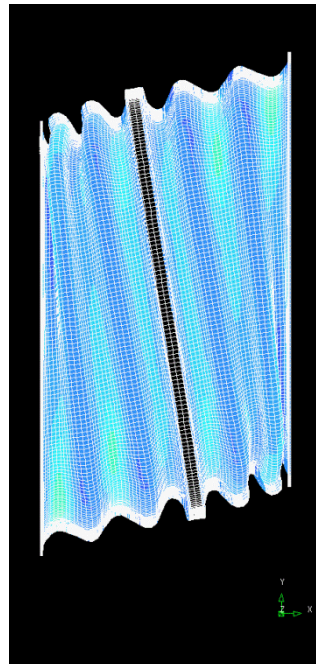
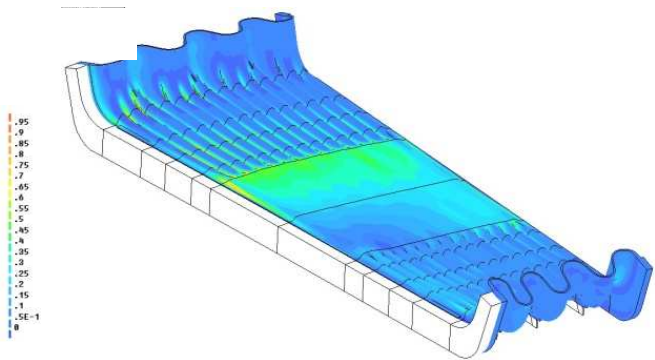


Design



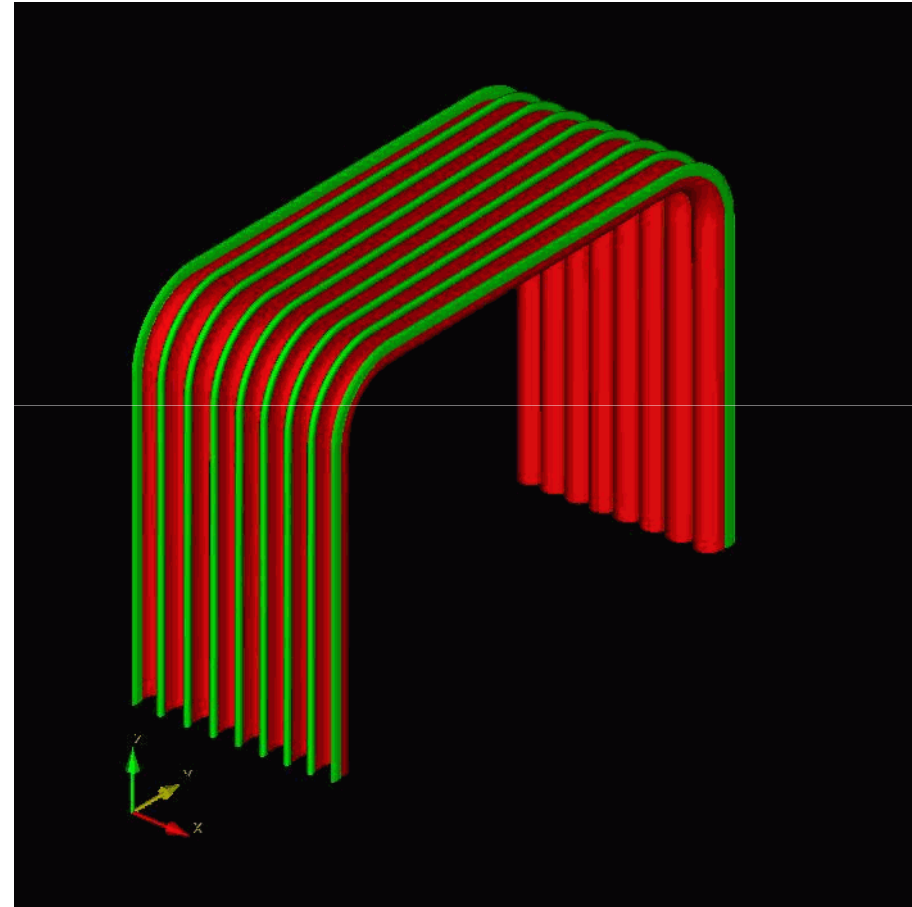
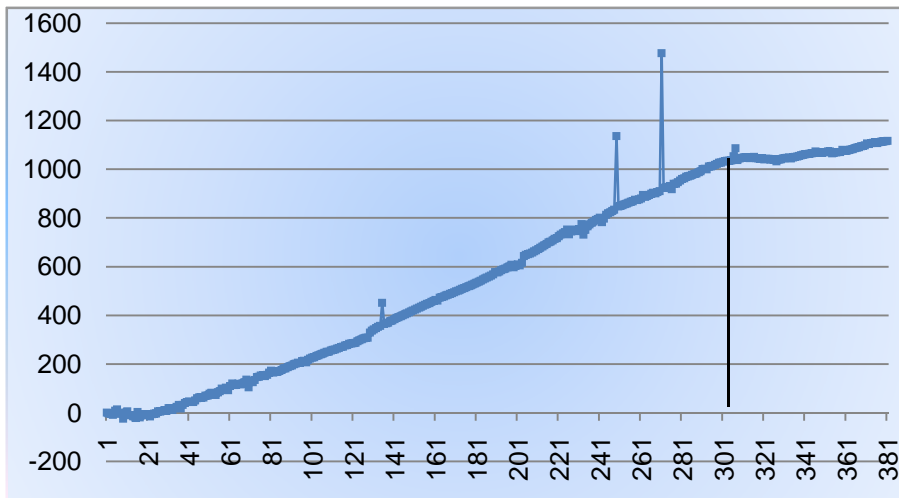
Calculation / Finite Elements Analysis

- ▶ Product : Self Supported Gangway
- ▶ Goal : Simulation in extreme lateral movement (650 mm)



Calculation / Finite Elements Analysis

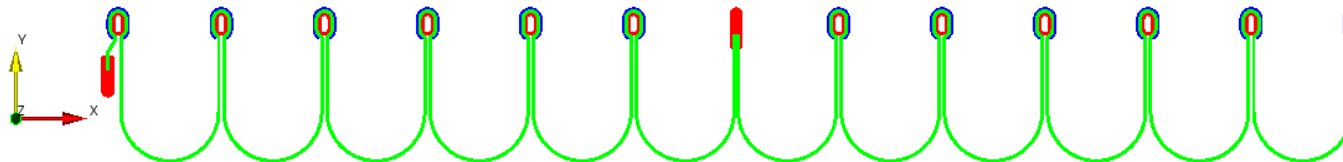
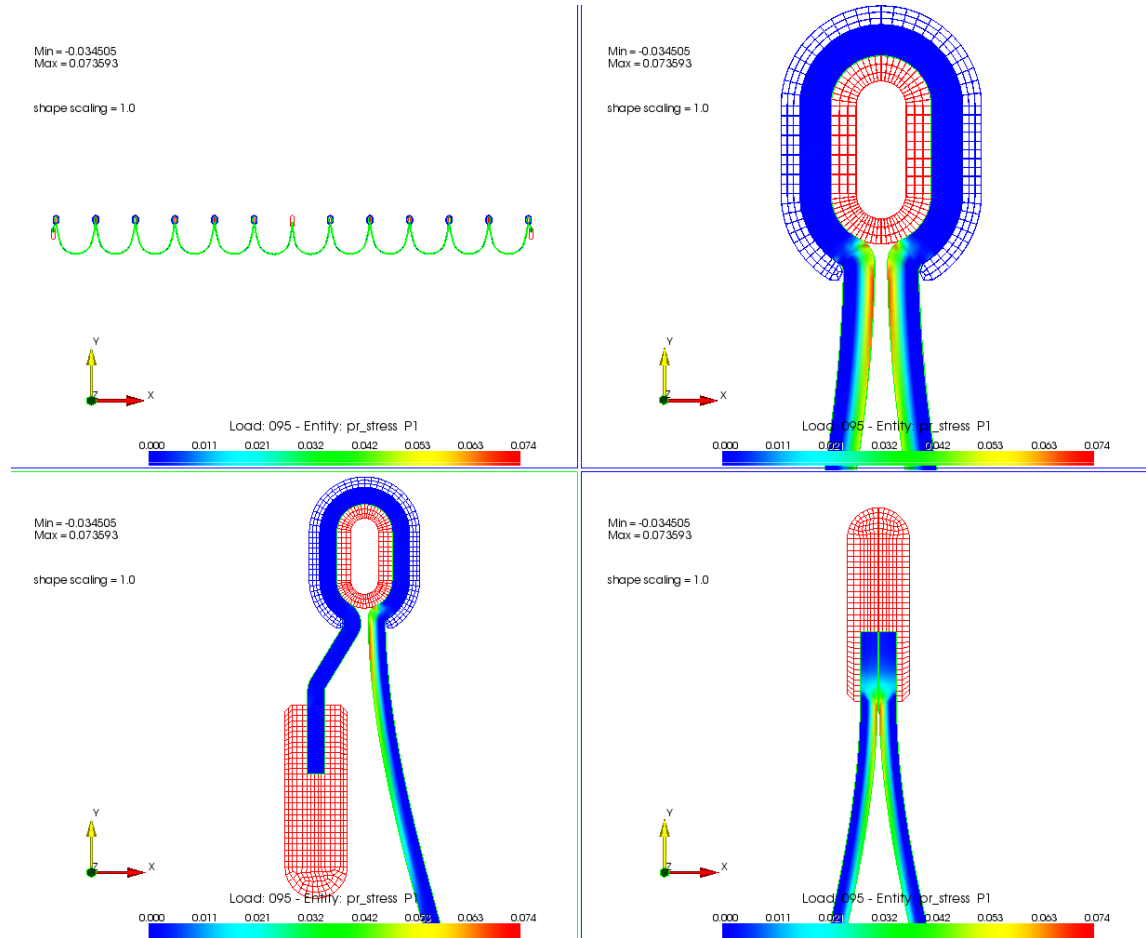
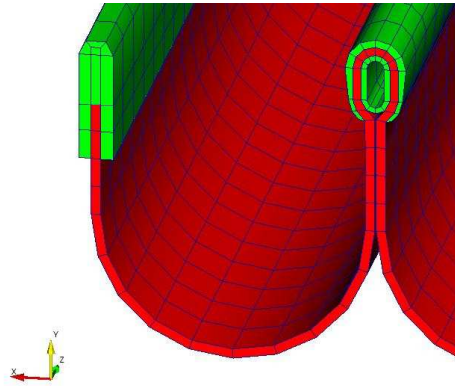
- ▶ Product : LRV Bellows
- ▶ Goal : Study deformation during extreme lateral movement



Calculation / Finite Elements Analysis

▶ Product : LRV Bellows

▶ Goal : Wave optimization

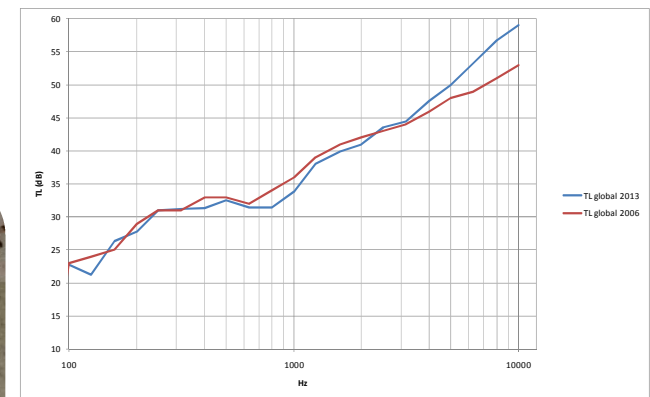
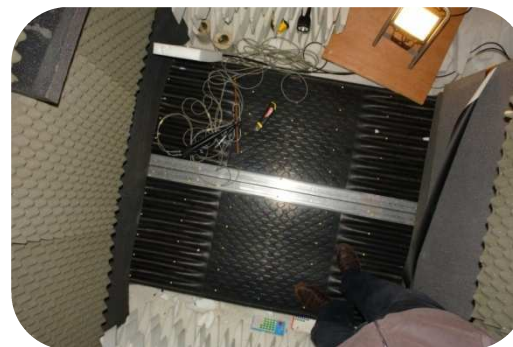


Gangway test bench

- ▶ Simulation of the cars displacement in curves and switches
- ▶ Estimation of the lifetime of gangway



Acoustic chamber room



Mounting test / First assistance



Test & validation in service



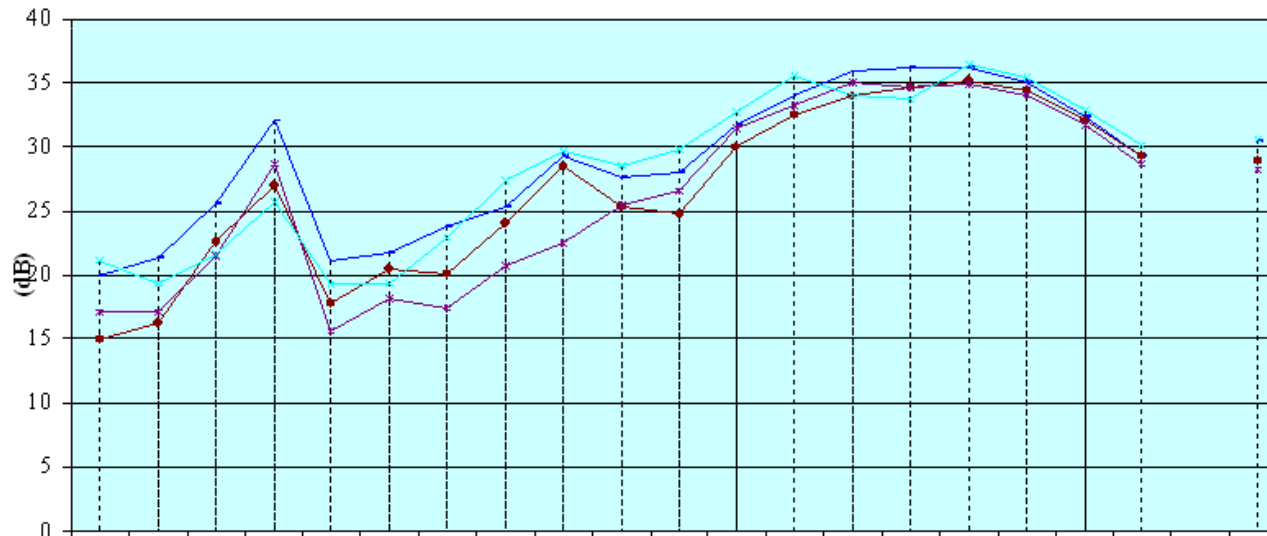
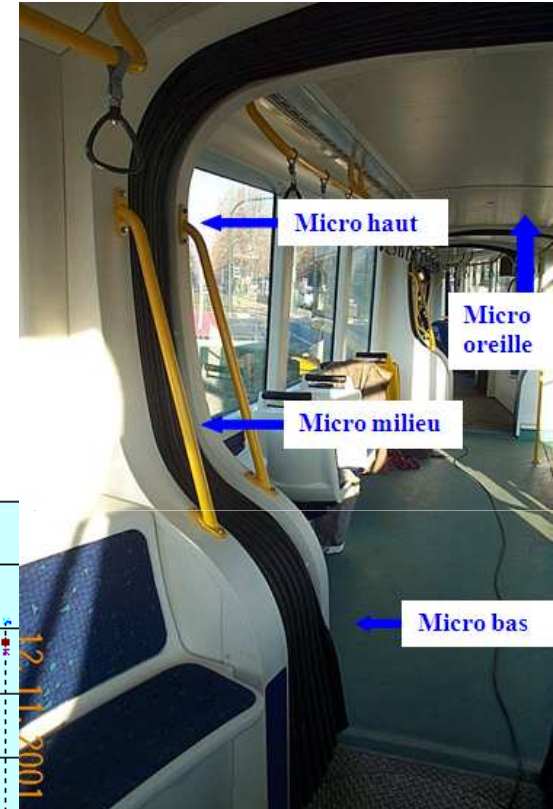
Situation on the bench



Situation on the train



Acoustic Test in Service



	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	500-10kHz
Ljf_ear	20,0	21,4	25,6	32,0	21,0	21,7	23,7	25,3	29,2	27,6	27,9	31,7	34,1	35,8	36,1	36,2	35,0	32,4	29,3	30,4
Ljf_high	14,9	16,2	22,6	27,0	17,8	20,4	20,1	24,1	28,4	25,4	24,7	29,9	32,5	33,9	34,6	35,0	34,4	32,0	29,2	28,9
Ljf_midle	17,0	17,0	21,5	28,7	15,7	18,1	17,5	20,7	22,4	25,5	26,5	31,4	33,2	35,0	34,6	34,8	34,0	31,6	28,7	28,1
Ljf_low	21,2	19,3	21,6	25,6	19,2	19,3	22,9	27,4	29,6	28,5	29,8	32,7	35,4	33,9	33,7	36,4	35,4	32,8	30,1	30,6

We make it *possible*