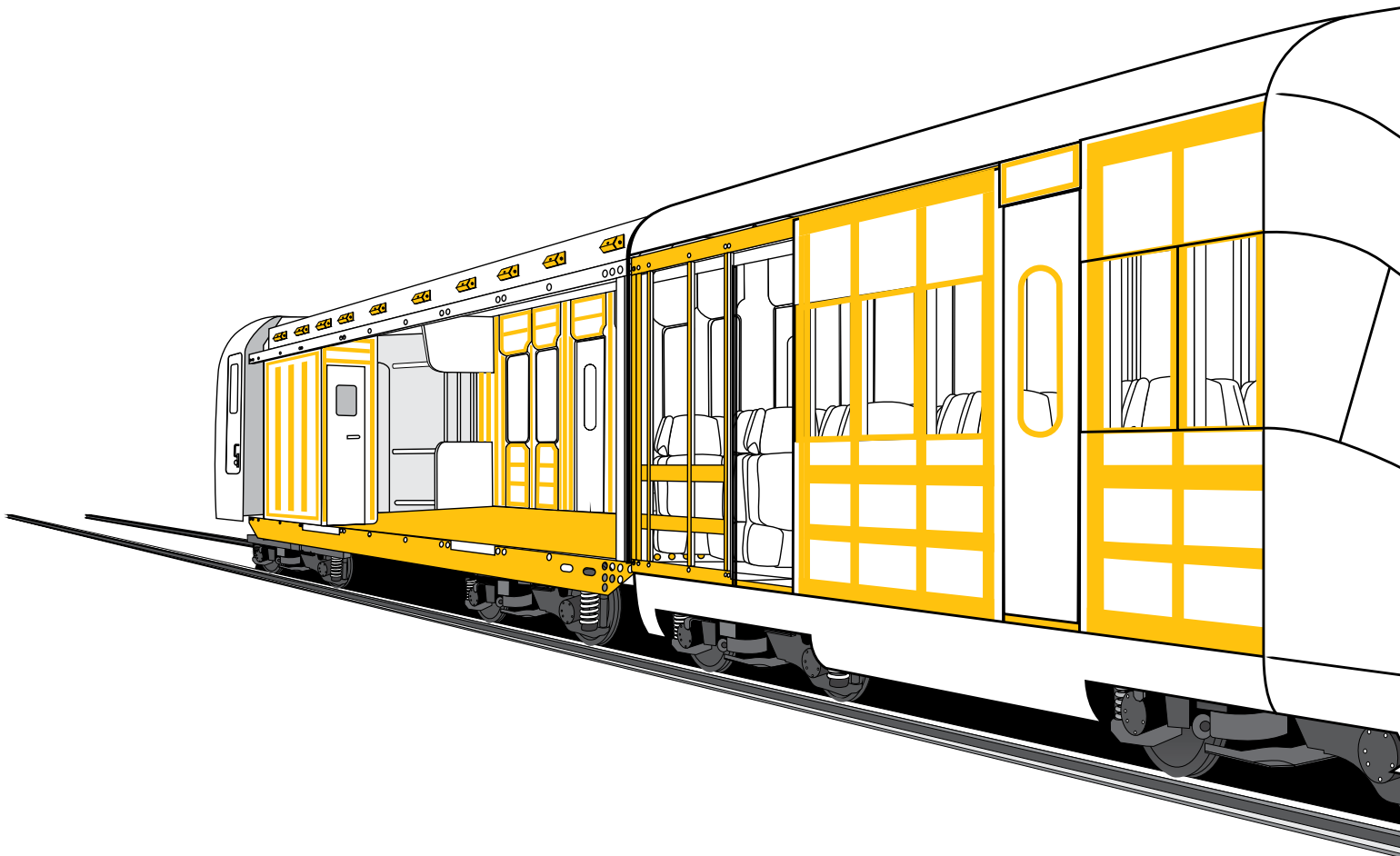




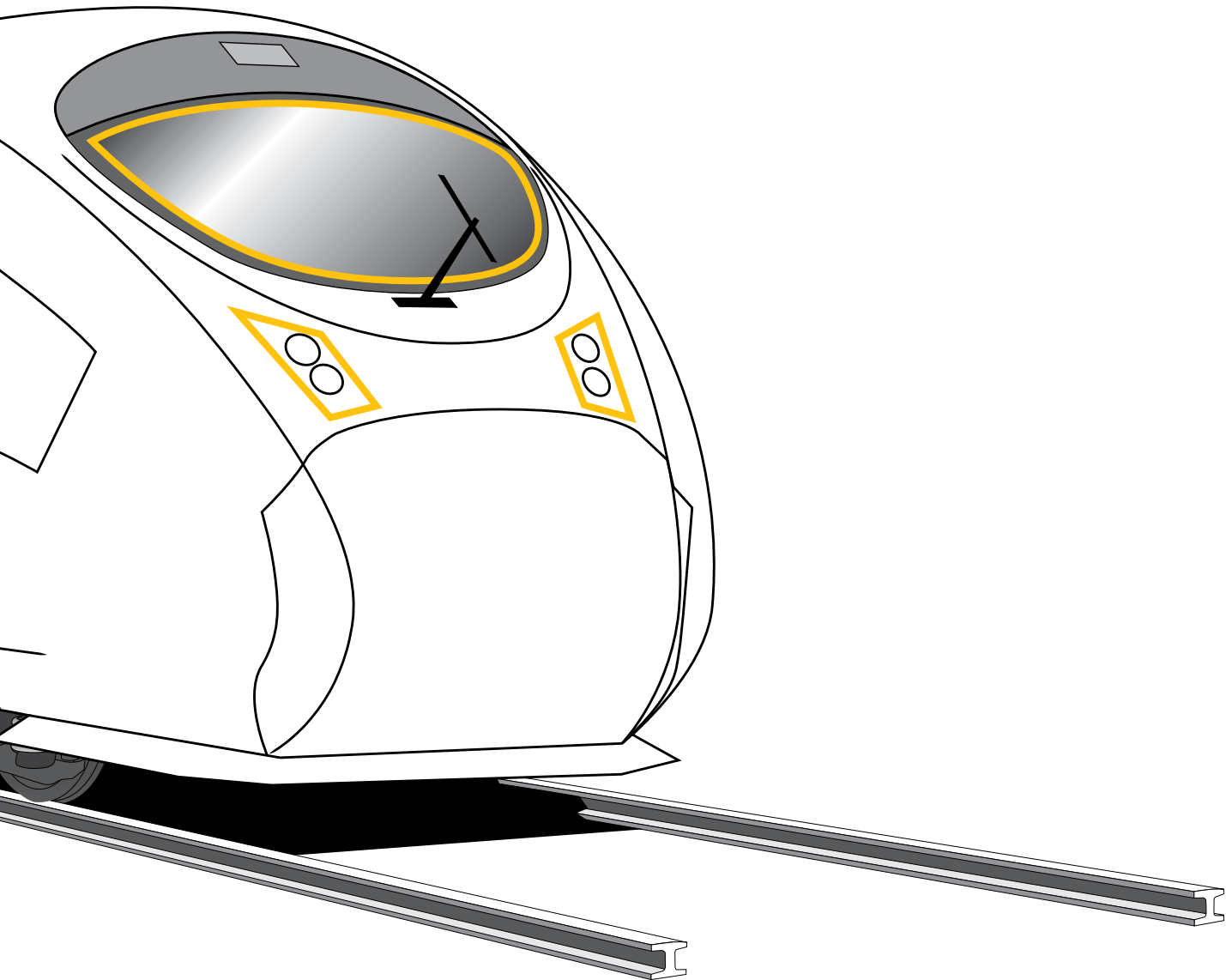
RAIL  
LEADING INNOVATION  
IN A DYNAMIC INDUSTRY



# LEADING INNOVATION IN A DYNAMIC INDUSTRY

The global rail market is a dynamic mix of demanding and highly challenging environments. Rail vehicle manufacturers expect improvements in manufacturing processes, repair solutions and innovation in vehicle design in order to compete. Rail operators need designs leading to higher safety levels for passengers, increased reliability to reduce operating costs and provision of a comfortable, reliable and efficient service.

Sika provides state of the art technological solutions that assist rail vehicle manufacturers and operators in meeting weight reduction and vehicle emission targets for their vehicles. As a global partner to our customers, we at Sika are able to offer precise local solutions quickly, ensuring truly first class order handling, delivery, application development and technical and commercial support. As a specialty company for chemical products, we at Sika concentrate on our core competencies: Bonding, Sealing, Damping and Reinforcing.



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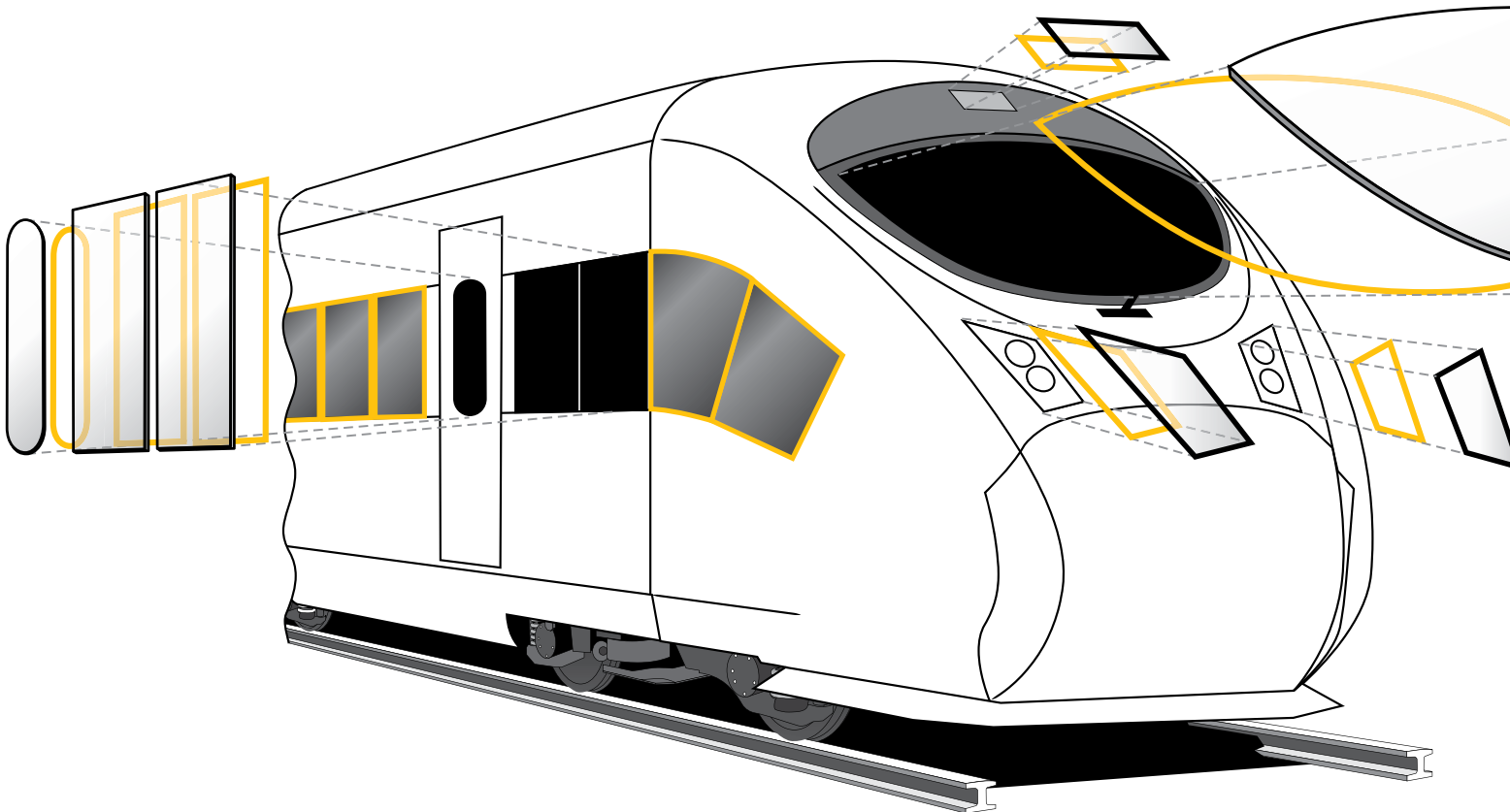
**14** Focusing on the Customer

# DIRECT GLAZING

**FOR OVER 20 YEARS**, Sika has been providing rail, bus, coach, automotive and truck OEM assembly lines with adhesive and sealant solutions for direct glazing and sealing. Primerless options are available to fit the needs of a variety of OEM application processes in order to create significant cost savings and manufacturing process simplification.

Cold or warm applied Sikaflex® systems are capable of retaining glass following installation, eliminating the need for additional clips, fixings and tape. Sika direct glazing adhesives can also provide low electrically conductive properties for elimination of galvanic corrosion. The SikaTack® range of products, with its booster technology, offers the rail vehicle manufacturer the freedom of an easy to use, fast curing, high strength

adhesive, showing excellent mechanical properties with the shortest possible cure time. Unlike traditional two-component adhesive systems, this accelerated one-component system has the significant benefit of full product cure, regardless of the presence of the SikaBooster® paste, providing enhanced process quality, consistency and security.

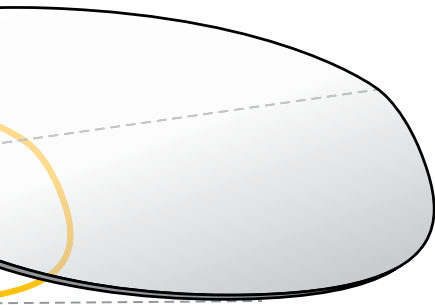




Adhesive is applied



The windscreen is fitted



### WHY DIRECT GLAZE?

Increased torsional stiffness of the carriage for increased roll-over strength and improved occupant impact protection

Enhanced aerodynamics in comparison to gasket glazed systems improving fuel economy

Reduced risk of standing water, reducing corrosion when compared to gasket glazed systems

### TECHNOLOGICAL BENEFITS

Proven Sika primerless to glass technology

Low conductivity

High initial green strength

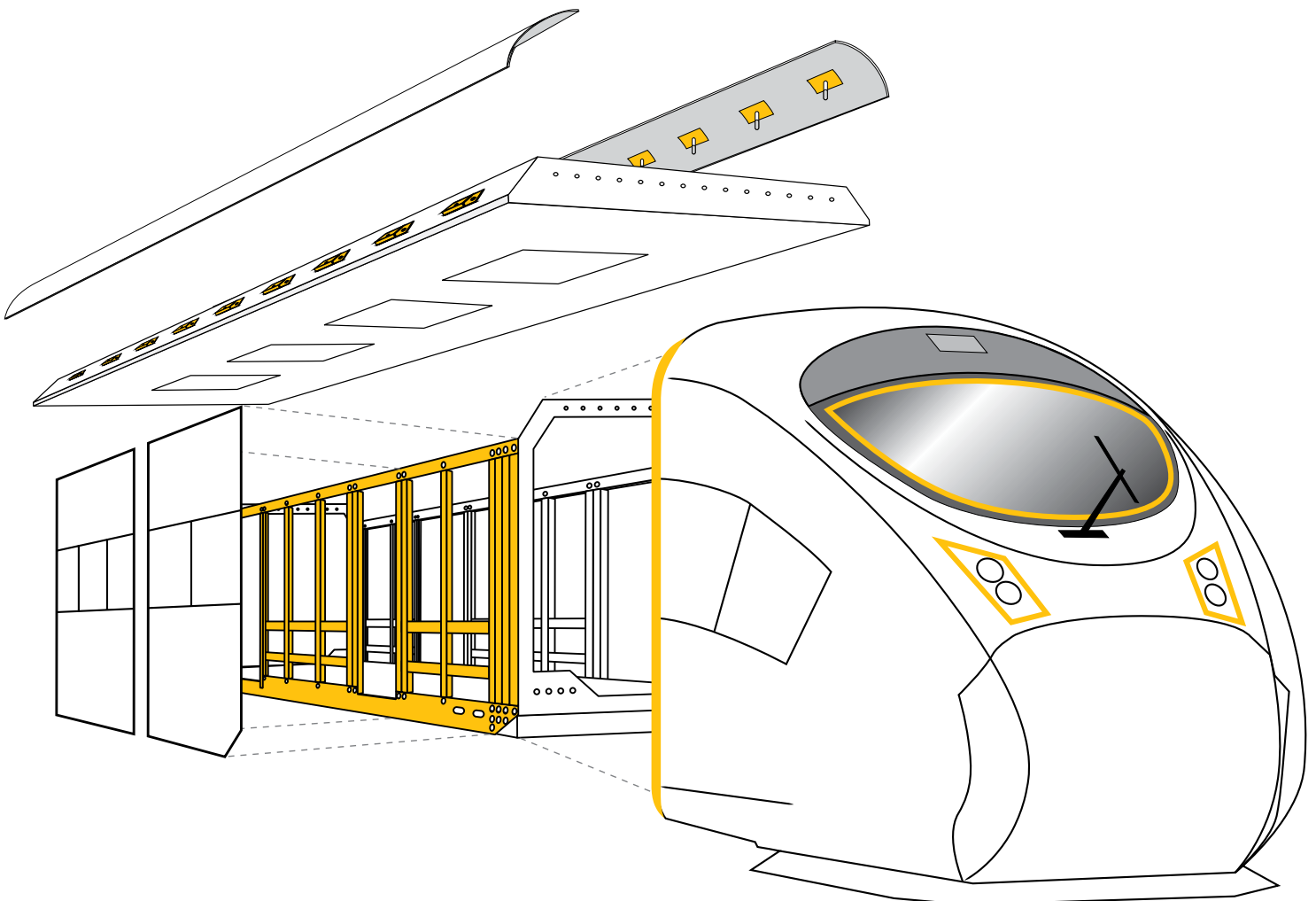
Warm applied systems eliminate secondary fixings, clips and tape

# EXTERIOR COMPONENT BONDING AND SEALING

**RAIL VEHICLE MANUFACTURERS FACE** tough, complex challenges in the design and assembly of the roof and mask systems for modern rail vehicles. High speeds, harsh climates and aerodynamic structural design stresses within the vehicle are all examples of the daily demands placed on elastic adhesives.

Sika provides high performance elastic assembly solutions, with a range of specifically formulated and optimised adhesives, developed to suit the needs of the rail vehicle designer. Sika also offers the rail vehicle manufacturer bonding and sealing solutions that meet both production and process requirements for fast cure, ease of use, consistent quality and cost. Sikaflex® polyurethane and hybrid polyurethane adhesives and sealants provide high performance elastic assembly and sealing of components, with a user-friendly, one-compo-

nent formulation. Sikaflex® hybrid technology provides the high performance of Sikaflex® polyurethane systems combined with reduced substrate surface preparation. SikaFast® two-component adhesives offer high strength, rapid de-jigging and cure times, good impact resistance, and low substrate surface preparation. The SikaForce® range of products offers semi- and full-structural adhesive solutions for bonding a wide spectrum of substrates used in rail vehicle interior assembly, such as metals, plastics, glass and coated steel.





Various stages of construction using Sikaflex®

#### WHY SEAL AND BOND EXTERIOR COMPONENTS?

Bonded assemblies can provide a lower weight solution than mechanically fastened systems

Elastic adhesive systems absorb noise and vibration, improving interior and exterior noise levels

Modular assembly techniques can be applied

Elastic bonded structures are more able to withstand shock and impact

#### TECHNOLOGICAL BENEFITS

Improved aesthetics and aerodynamic efficiency

Excellent resistance to harsh climatic conditions

Improved water and leak resistance

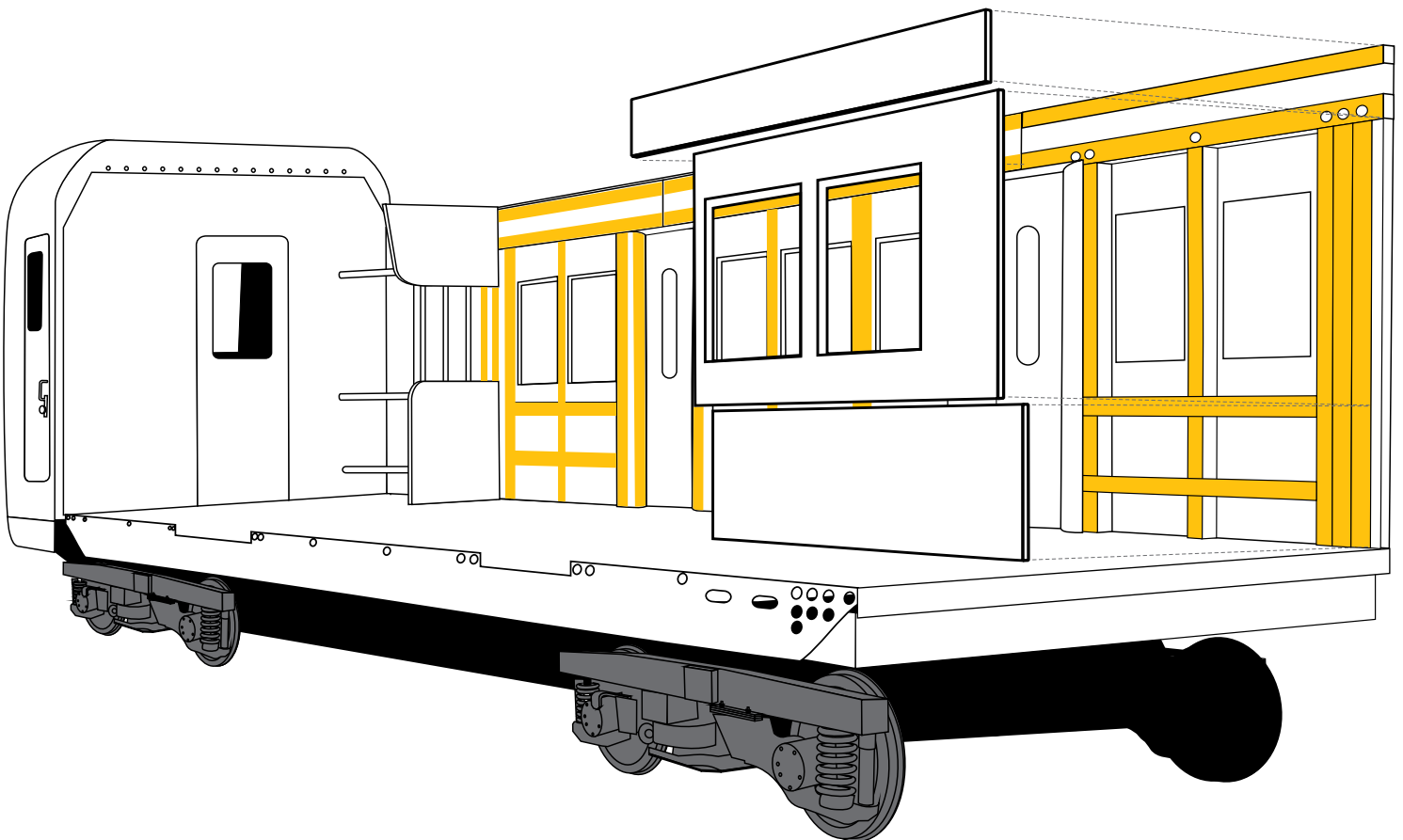
Improved sound and vibration damping

# INTERIOR COMPONENT BONDING

**MODERN RAIL VEHICLE INTERIORS** need to have a high durability and life expectancy in order to meet the day-to-day requirements of transporting people in high numbers. Rail vehicle operators need high performance and reliability from their interiors as repairs and breakdowns can be costly and disruptive.

Interior panels, brackets, sub-assemblies and lighting systems can all be built rapidly and reliably with Sika adhesives. The combination of fast assembly, rapid cure, flexibility, strength and performance can be achieved using one of a number of proven Sika adhesive systems. Sikaflex® polyurethane adhesives provide high performance elastic assembly of components, with a user-friendly, one-component formulation. Sikaflex® hybrid technology provides the high performance of Sikaflex® polyurethane systems combined with reduced

substrate surface preparation. SikaFast® two-component adhesives offer high strength, rapid de-jigging and cure times, good impact resistance, and low substrate surface preparation. The SikaForce® range of products offers adhesive solutions for bonding a wide spectrum of substrates used in rail vehicle interior assembly. Examples of these include materials such as aluminium, coated steel, glass, glass fibre reinforced plastics (GRP), painted substrates and plastics.







Applications of SikaFast® bonded clips



An interior panel is offered up prior to being fixed with Sikaflex®

### WHY USE INTERIOR COMPONENT BONDING?

- Compatible with all common rail industry substrates
- High impact resistance
- Wide range of cure speeds to suit diverse assembly techniques
- No damage to substrate or structure due to drilling or welding

### TECHNOLOGICAL BENEFITS

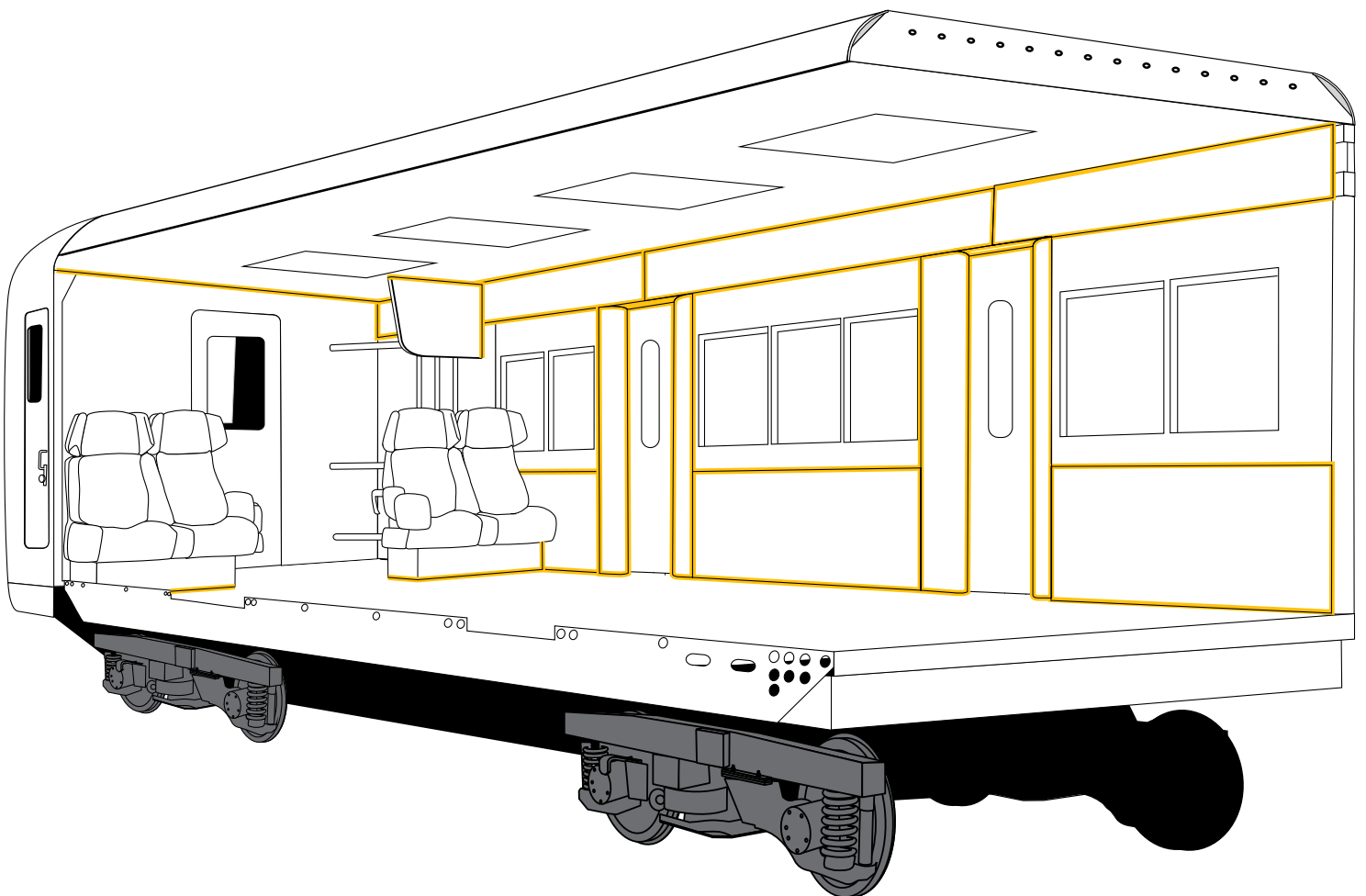
- Capable of bonding dissimilar materials with the avoidance of corrosion
- Rapid sub-component assembly
- Adhesive systems absorb vibration, improving interior vehicle noise levels
- Lower component costs due to the ability of adhesives to bond to different types of plastics, composites or metals that are otherwise difficult to assemble

# INTERIOR SEALING AND FIRE RESISTANT APPLICATIONS

**THE FINISH AND INTEGRITY** of a rail vehicle is crucial to its long-term durability. A robust, watertight seal protects the wiring looms, vital electronic equipment and other components housed below the floor and behind interior panels. Sika has developed a range of products specifically formulated to offer long-term solutions for permanent elastic seals.

With their easy to use one-component formulation, Sikaflex® polyurethane adhesives finish interior components with a high performance elastic seal. Sikaflex® hybrid technology combines the performance of traditional Sikaflex® polyurethane systems, but shows additional characteristics such as reduced substrate surface preparation. SikaFiresil® can also provide a highly elastic flame retardant and UV resistant silicone sealing solution.

In certain applications, it is essential that products show fire resistant characteristics and comply with both local and international railway standards. These standards specify the performance of adhesives and sealants in some of the most exacting environments in the world, both above and below ground. If required these standards can be achieved by specific joint geometries with the inclusion of certain Sika assembly adhesives. Sika has developed a range of easy to use products that have been tested to international standards for use in fire resistant applications that still maintain joint strength and durability.





The joint between cab and main chassis, shown from the inside



An interior joint is filled

### WHY USE INTERIOR SEALING AND FIRE RESISTANCE PRODUCTS?

- Improved acoustic environment
- Compliance with international fire standards
- Watertight seals ensure protection of vital electronic and safety equipment
- More efficient air conditioning and heating

### TECHNOLOGICAL BENEFITS

- High levels of aesthetic finish achievable
- Permanent elastic seals maintain the integrity of a rail vehicle interior
- High levels of fire resistance can be achieved

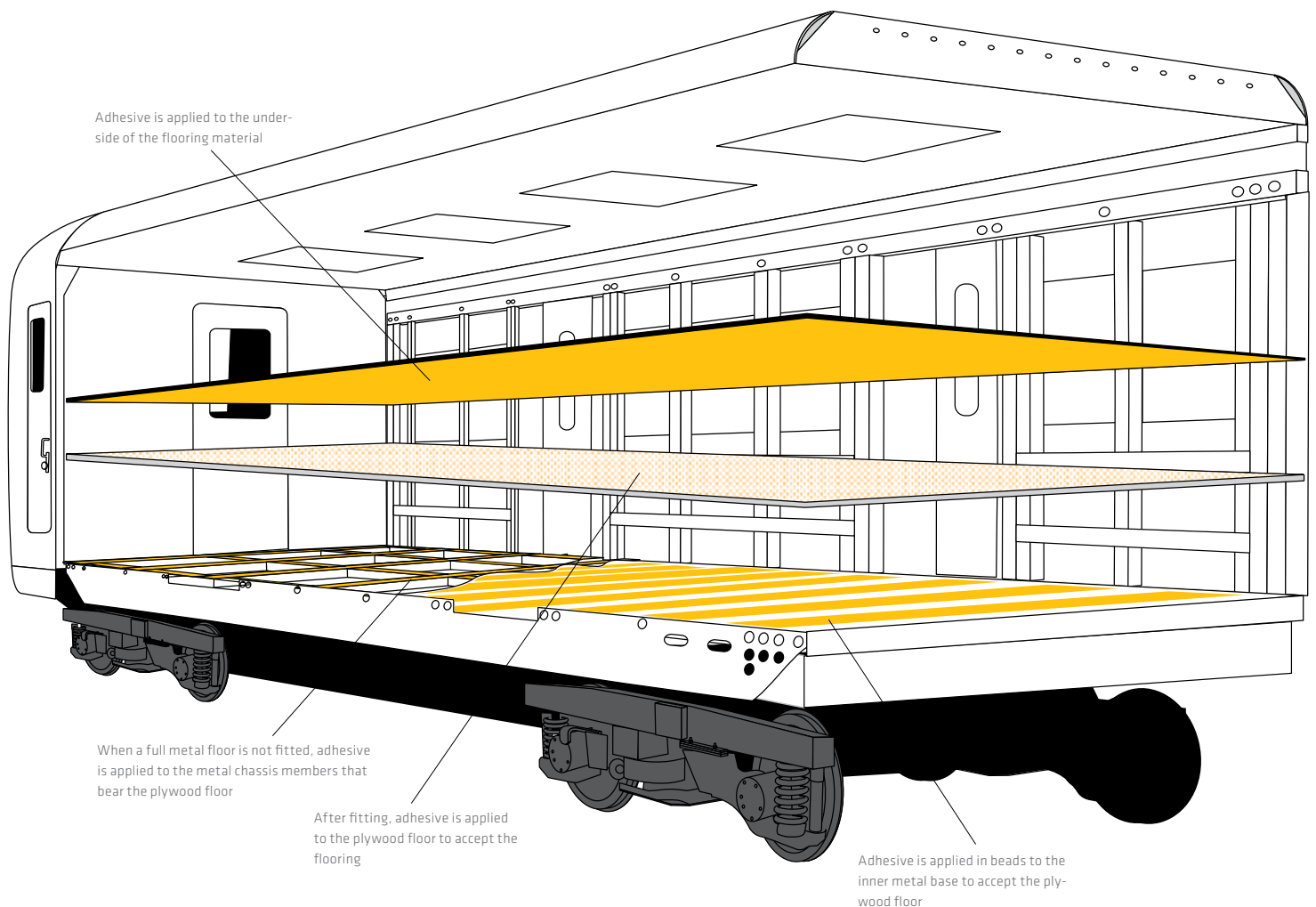
# FLOOR BONDING

**MODERN RAIL VEHICLES REQUIRE** the use of a number of high performance flooring materials during manufacture. Travelling comfort, lower vibration and better sound damping are but a few of the specifications that now need to be considered.

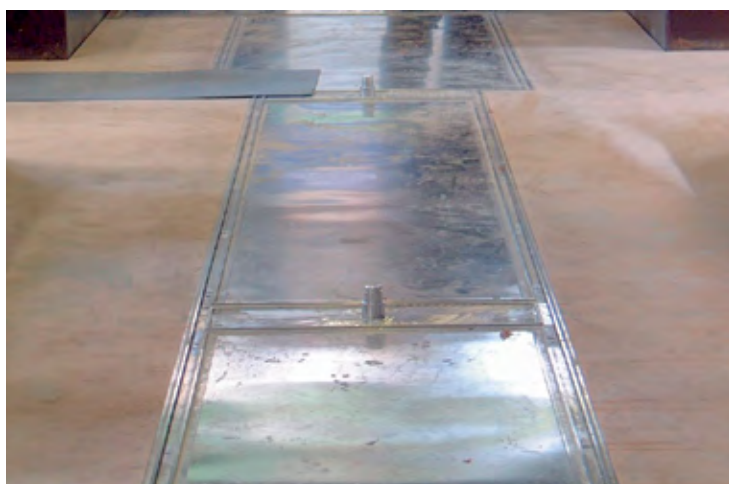
Sika has formulated a range of elastic solutions for floor bonding applications that enable rail vehicle manufacturers to meet these specifications. With a user-friendly, one-component formulation, Sikaflex® polyurethane adhesives are used for high performance elastic assembly of components. Sikaflex® hybrid technology still has the high performance of Sikaflex® polyurethane systems but is combined with reduced substrate surface preparation. The Sikaflex® Plus Booster

system combines the high performance characteristics of Sikaflex® but with rapid full cure. The SikaLastomer® butyl sealants provide excellent sound damping and sealing properties. SikaForce® two-component polyurethane combines high strength and good flexibility.

In today's world, rail vehicle interiors are expected to look stylish, attractive and inviting, and also to be finished to a



very high standard. The floor covering used on a rail vehicle contributes significantly to this overall effect and is now one of the key elements in the design of rail vehicle interiors. This material is not solely used where floor traffic is encountered; it is also used to trim adjoining areas such as sidewalls, toilet cubicles and seat brackets. The SikaSense® product range offers a complete solution for bonding floor coverings to different substrates such as coated steel, aluminium, wood and plastics. These materials have, until now, been very difficult to bond. This range of products is easy to use, has excellent initial 'grab' and long-term adhesion to common flooring substrates. Together with an outstanding resistance to high temperatures and ageing.



Plywood flooring is cut to size and bonded to the chassis using Sikaflex® Plus Booster. The floor is finished with a floorcovering bonded with SikaSense®.



#### WHY USE FLOOR BONDING?

- Avoidance of corrosion, elimination of drilling or piercing of the chassis for mechanical fastener fixing of floor panels
- Water resistant floor construction is achievable, leading to less floor de-lamination and repairs
- Reduced interior noise and vibration levels are achievable

#### TECHNOLOGICAL BENEFITS

- Good sound damping, leading to improved passenger comfort
- Resistant to harsh climatic conditions
- Excellent heat and ageing resistance
- Broad substrate compatibility

# FOCUSING ON THE CUSTOMER

**SIKA DEVELOPS BONDING, SEALING, DAMPING AND REINFORCING** solutions in close co-operation with our OEM customers in the rail industry.

To Sika, this means not only developing best in class technology solutions to match our customer's technical and commercial requirements, but to also ensure appropriate performance throughout the design, prototyping, validation and full production phases. Specialists in Sika's R&D, Technical Service, Systems Engineering and Application Technology concentrate on devising appropriate client oriented solutions.



## **TECHNOLOGY CENTRES**

Sika Technology Centres are focused on the development of new materials. This allows Sika to actively promote technology development within the rail market, and to add value to the activities of our customers.

## **TECHNICAL SERVICE**

Sika Technical Service teams are located around the world, and are dedicated to providing best practice selection, validation and application of Sika materials. By being located close to our customers, Sika Technical Service can ensure optimum local language communication and understanding throughout the technical application development process to ensure best possible results for our customers.



**SYSTEM ENGINEERING**

Application Technology is a key success factor in the use of adhesives and sealants. Sika's System Engineering Competence Centre focuses on this important task and develops new concepts aimed at holistic solutions for our clients. In this way we partner the development of solutions including pumping and application systems as well as automated robotic equipment specifically designed to meet individual customer needs.

**LOCAL SERVICE AND SUPPORT**

With major sales, service and logistics operations around the globe, Sika provides customers with world scale customer service, sales and logistics support via local dedicated teams in local languages.

**CAD/CAE SUPPORTED DEVELOPMENT**

Sika concentrates on Computer Aided Design and Engineering of structurally reinforcing process materials. As our customers increasingly utilize static and dynamic simulation tools to design, develop and validate new vehicle structures, Sika has the expertise and competence to support vehicle development programmes in the appropriate software coding utilized by our customers.

SPECIALISTS IN SIKA'S R&D, TECHNICAL SERVICE, SYSTEMS ENGINEERING AND APPLICATION TECHNOLOGY CONCENTRATE ON DEVISING APPROPRIATE CLIENT ORIENTED SOLUTIONS.



# GLOBAL BUT LOCAL PARTNERSHIP



## FOR MORE SIKA RAIL INFORMATION:



[www.sika.com/rail](http://www.sika.com/rail)

### WHO WE ARE

Sika AG, Switzerland, is a globally active specialty chemicals company. Sika supplies the building and construction industry as well as manufacturing industries (automotive, bus, truck, rail, solar and wind power plants, facades). Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing and protecting loadbearing structures. Sika's product lines feature highquality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



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