



DESIGN TRIANGLE



Specialists in Rail Vehicle Design

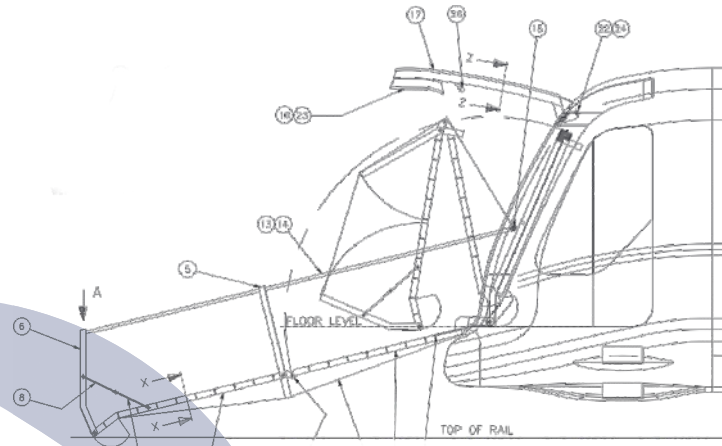
We deliver creative design solutions for vehicle interiors and exteriors, as an integrated service of industrial design, engineering design and ergonomics, to service operators, vehicle builders and component manufacturers around the world.

Integrated Design

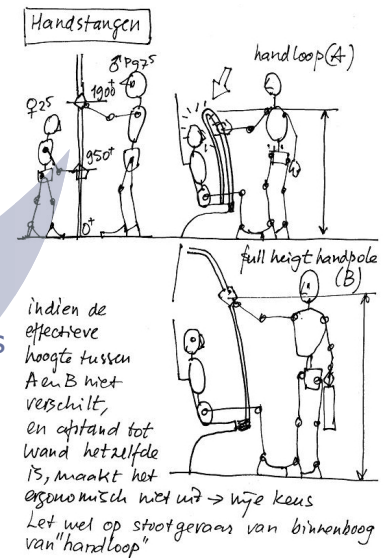
Design Triangle are specialists in rail vehicle interior and exterior design. We offer industrial design, engineering design and ergonomics as an integrated service. Our clients include rail service operators, vehicle builders and component manufacturers around the world.



Industrial Design



Engineering Design



Ergonomics

Design Triangle provides innovative design, combined with delivery of manufacturable and maintainable solutions, from a single source.

We provide creative design and engineering design, for rail, metro and tram systems in the UK, Europe and worldwide.

We provide a range of services from ergonomics research, concept design and photo-realistic 3D visualisation, to technical development and manufacturing data.

Design

Our industrial designers create innovative ideas and styling concepts efficiently and in short timescales. They develop colour schemes, finishes and textile designs, refine forms and generate photo-realistic images.

Engineering

Our engineering design team use CAD systems and analysis tools to develop the concepts into reality, achieving compliance with regulations, safety, ease of manufacture and low running costs.

Ergonomics

Our Human Factors specialists ensure that our designs are comfortable for passengers and efficient for drivers.

We offer a range of services, which can be combined to form a single-source design and development programme:

Research

Matching the needs of customers to available technology

Concepts

Innovative ideas and creative designs for competitive new vehicles

Visualisation

Effective communication of ideas speeds introduction to market

Development

Design-for-manufacture, analysis and the refinement of forms

Prototypes

Prototypes allow the review and testing of proposed designs

Introduction

Design Triangle delivers creative design solutions to the rail industry. We specialise in the design of rail vehicles for operators and manufacturers in UK and worldwide.

Recent projects include designs for Crossrail, Amsterdam Metro trains, Swiss Railways and TfL's East London Line.

Creativity

We provide creative design and engineering as attractive and practical vehicle interior and exterior designs for service operators and vehicle manufacturers.

Innovation

Clients as diverse as Virgin Atlantic and Mercedes Benz come to us for new ideas.

Experience

Design Triangle, established in 1986, has become one of Europe's foremost vehicle design consultancies, with an international range of clients.

Project Management

We employ well-developed project plans, managed on time and to budget. We provide clearly defined, fixed-price contracts.



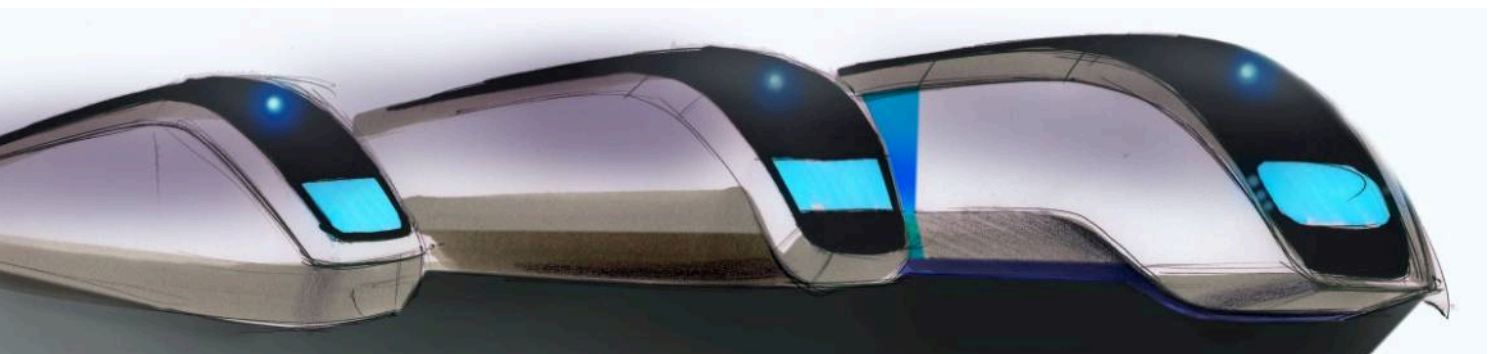
25 years experience

rail operator clients:

DB
DLR
DSB
Gatwick Express
Heathrow Express
MTR Corporation
NS
ÖBB
RATP
RENFE
SBB
SNCB
Stansted Express
TfL

example projects:

Crossrail
East London Line Class 378
Amsterdam Metro M5/M6
Irish Rail InterCity Mk4
Docklands Light Railway - B2007
Northern Ireland Railways C3000
STIB Brussels M6 (BOA)
Heathrow Express
Metro de Madrid S-8000
Melbourne Alstom X'Trapolis
MTR Corporation TKO Extension
MTR Corporation EMU Modernization
MTR Corporation Airport Express
Rotterdam Metro 5300 Series



• Heathrow Express
• Crossrail



DESIGN TRIANGLE

Exterior Design

Design Triangle delivers creative design solutions for rail vehicles.

Innovative Concepts

Manual concept renderings are created during the early stages of a design project, to develop ideas quickly and efficiently.

Development

Innovative exterior designs are developed into 3D CAD models by an experienced engineering design team.

Form Development

The exterior forms of the vehicle are developed in 3D. Iconic examples include Crossrail, Heathrow Express and MTR Airport Express.

Photo-realistic Images

The CAD models are rendered to create photo-realistic images of the vehicle, showing alternative colour schemes, finishes, livery and branding.

Photo-montages and Videos

Rendered CAD models are photo-montaged onto images of the environment, or animated to create video presentations.

Engineering Development

Once the concept design has been approved, our engineering team develop the CAD models, to create prototype and 3D tooling data.



- Crossrail
- Heathrow Express
- DLR
- Blackpool Tram
- MTR
- AMSYS M6





Interior Design

- Heathrow Express Class 332
- East London Line
- Manchester Metrolink
- Irish Rail InterCity
- Heathrow Express First Class

Innovative and Practical Design

Design Triangle produce interior designs for new build and refurbishment, from concepts through to manufacturing drawings and 3D CAD data.

Layout Design

Real-world testing has given Design Triangle a hands-on understanding of the demands of accommodating peak passenger capacity, fast boarding and alighting.

Interior Finishes and Textile Design

Our designers set trends in interior colour schemes and textile design, whilst understanding the constraints on material selection.

Lighting Design

In lighting design, we have in-service experience of developing new lighting systems, including LED lighting, life cycle cost studies and the effects of lighting colour temperature.

PRM-TSI and RVAR Compliance

Our engineers have years of experience of successfully applying PRM-TSI and RVAR regulations to compliant vehicle designs.

Component Design

Design Triangle has decades of experience in the design of seating, tables and interior panel systems.



Livery, Colour & Trim and Branding

Design Triangle create and apply vehicle and service brand identities to support your business strategy, compliant with rail regulations.

Rail travel is a competitive market where, in order to survive, brands must communicate why customers should choose them. Successful vehicle brand identity design can greatly enhance public perceptions of a service.

Design Triangle have successfully implemented livery and branding projects for rail service operators, ranging from the creation of a 3D identity for the MTR Corporation fleet, to the specification of unique body colours for LUL, Heathrow Express and Manchester Metrolink.

Interior Colour and Trim is also a vital way of communicating ownership and service. Design Triangle offer a full exterior and interior branding service, with new ideas which complement an existing identity or define a new travel experience.

For the MTR Corporation, Design Triangle created a strong vehicle exterior brand identity for A-stock, K-stock and M-stock, which is has recently been applied to CRC stock.

service brand design

- SBB Swiss Railways
- Heathrow Express
- MTR Corporation

vehicle livery design

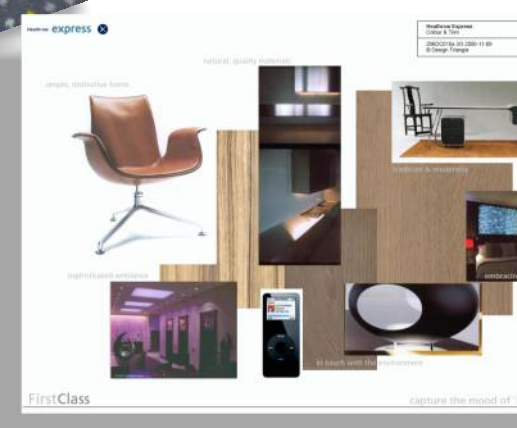
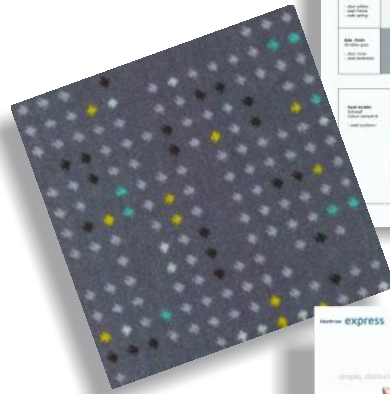
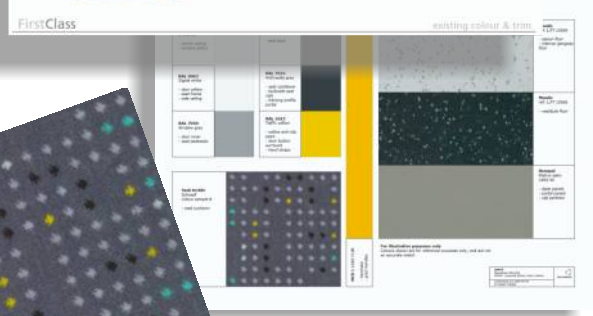
- Blackpool Bombardier *FLEXITY* 2 tram
- Heathrow Express First Class RBS

vehicle livery application

- Manchester Metrolink M5000
- Heathrow Connect

company branding

- Antonov plc



- Heathrow Express RBS
- Heathrow Express First Class
- Manchester Metrolink M5000
- Antonov
- Blackpool Tram



Refurbishment Design

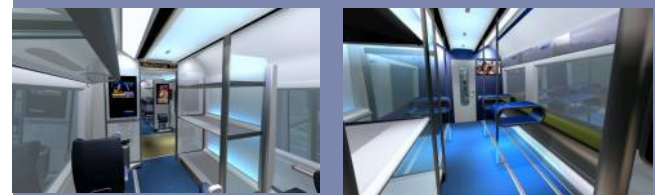
Design Triangle offer a design service for rail vehicle refurbishment, from minor components to full interior refit programmes.

Design Triangle have prepared concept designs for full vehicle interior and exterior refurbishments, including:

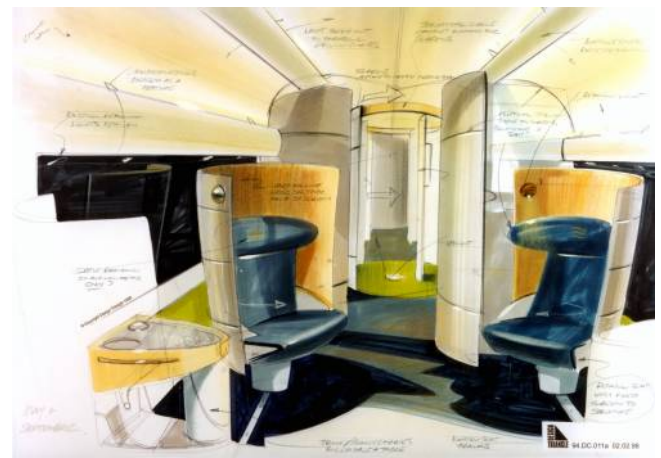
- Heathrow Express First Class interior
- Gatwick Express First Class interior
- MTR EMU Modernization interior/exterior
- Eurostar VIP Lounge

Design Triangle have also developed refurbished components to production, including:

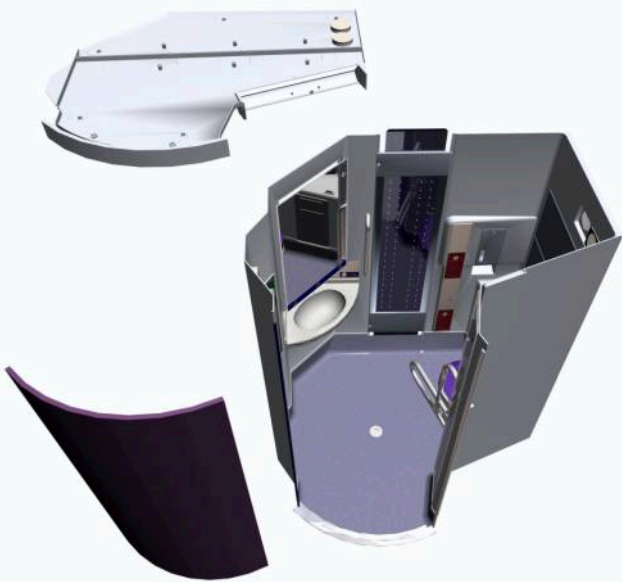
- Interior panels, moulded panels & hinged panels
- Carpets & floor covering
- Toilets
- Seats
- Lighting - fluorescent & LED
- Infotainment displays
- Handrails
- Driver's cab interiors
- Headlamp assemblies
- Label sets



Heathrow Express:
• First Class interior
• Olympic Car

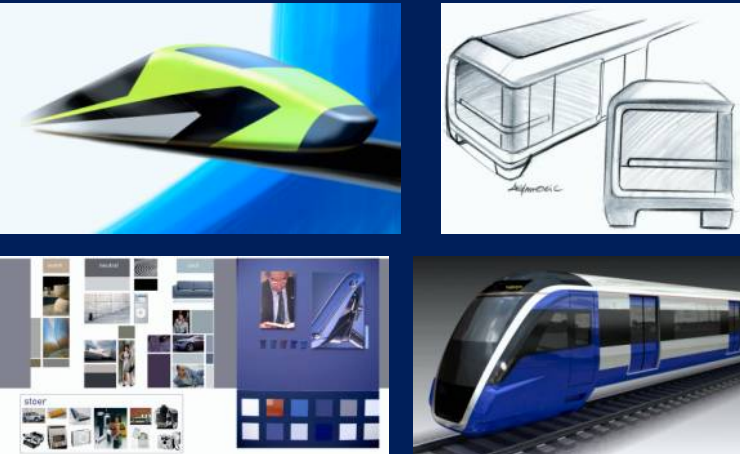


• Eurostar Lounge
• MTR Modernisation
• Gatwick Express
• Heathrow Express toilet and interior panels

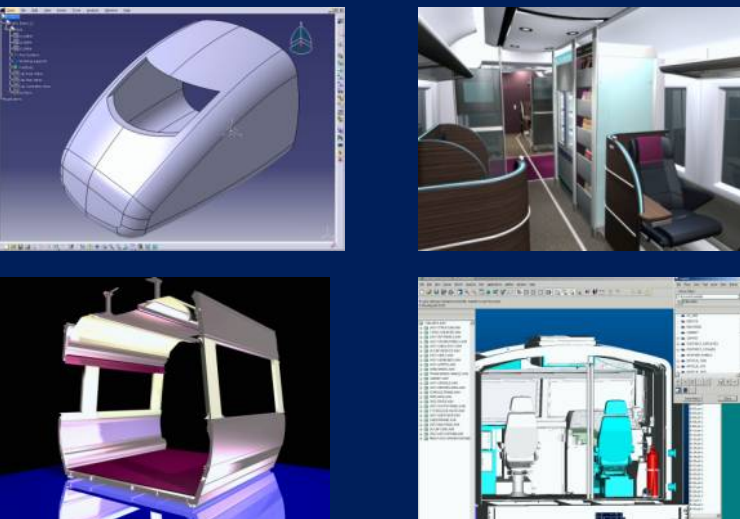


Specialists in rail vehicle interior and exterior design. We offer industrial design, engineering and ergonomics within a single integrated design approach. Our clients include mass transit authorities, train operators, vehicle manufacturers and component manufacturers to the rail vehicle industry around the world.

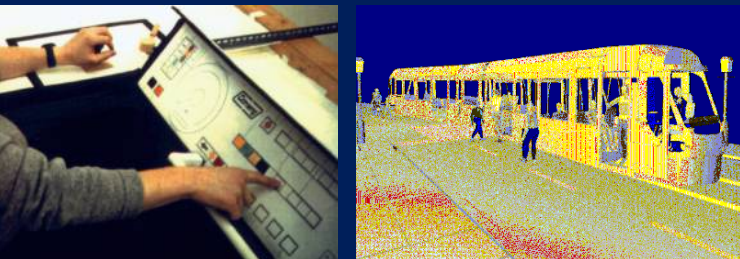
Industrial Design



Engineering Design



Ergonomics



Design Triangle offer a range of services, which can be combined to form a single-source design and development programme:

research

understanding the needs of customers and users

ergonomic research (passengers and drivers)
market research

concepts

innovative ideas and creative designs for competitive new products

brainstorm

design sketches and illustrations
evaluation decision matrix
ergonomic models SAMMIE CAD
feasibility studies
exploded views

visualisation

effective communication of ideas speeds introduction to market

photo-realistic ray-trace renderings
3D CAD animated walk-through videos

development

engineering development, analysis and refinement of forms

form and surface development
3D CAD models
FE stress analysis
dynamic and vibration analysis
design for manufacture
sourcing and cost estimation
design for manufacture and assembly
design for maintenance
safety and reliability checks
ergonomic user trials

models and prototypes

allowing testing and approval of proposed designs

2D prototype drawings
3D CAD data
scale models
full size mock-ups
prototype build
vehicles
vehicle interiors
components
prototype testing
production drawings
manuals and documentation

