

# Developing a lightweight, low cost, foot bridge application with a competitive finance solution

Composites in Building and Infrastructure 2018

Julien Sellier



# Agenda

- Introduction
- Composites in buildings and infrastructure
- Rail safety standards
- Composite railway footbridges
- Financing solutions
- Projections
- Conclusions



# Introduction

# STRUCTeam Overview

- 150+ completed projects
- One of the leading independent composites consultancy
- World class engineering team of 20 including 4 PhD
- Cross-sector experience and great flexibility

## Management and technology solutions within the composites applications markets



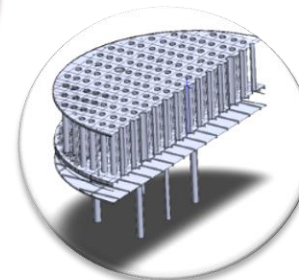
# Our Markets



Automotive



Renewables



Industrial and  
Petrochemical

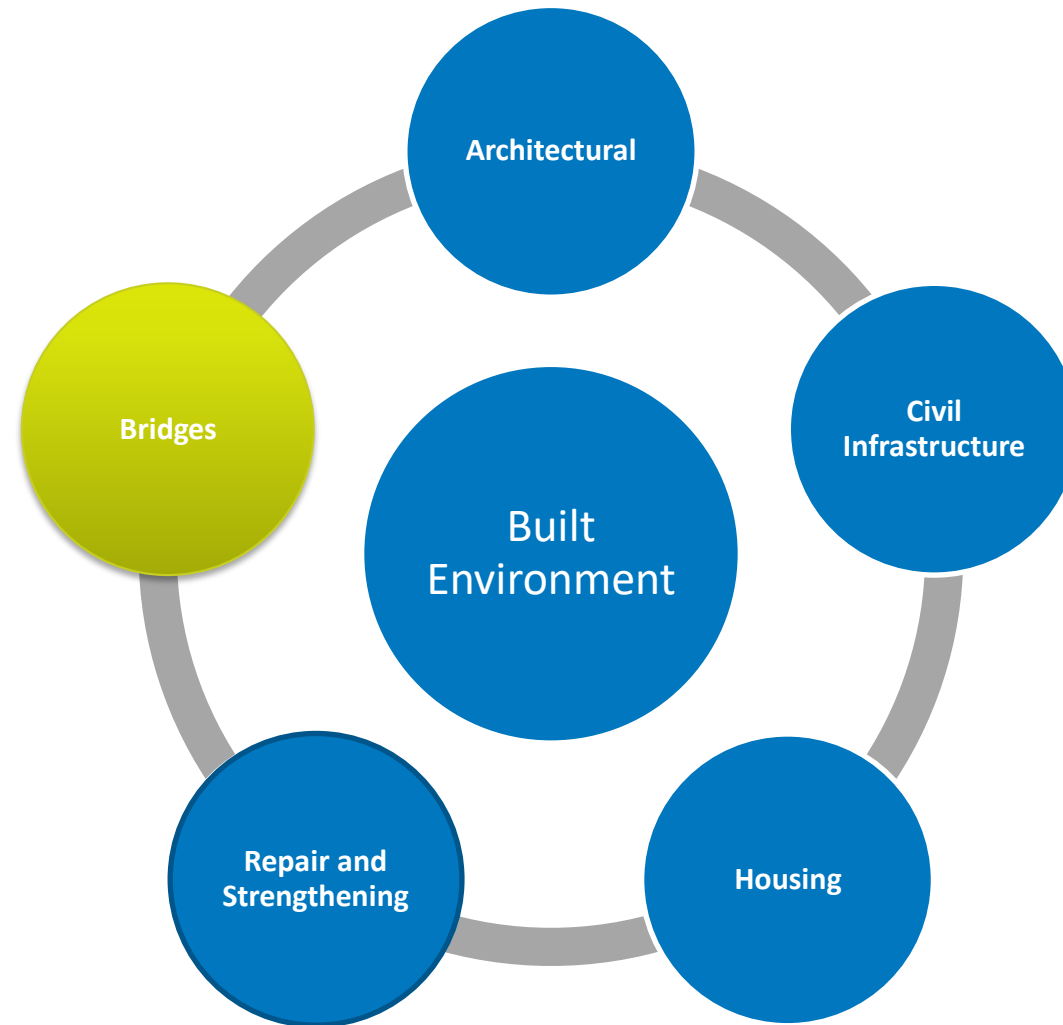


Marine, Offshore



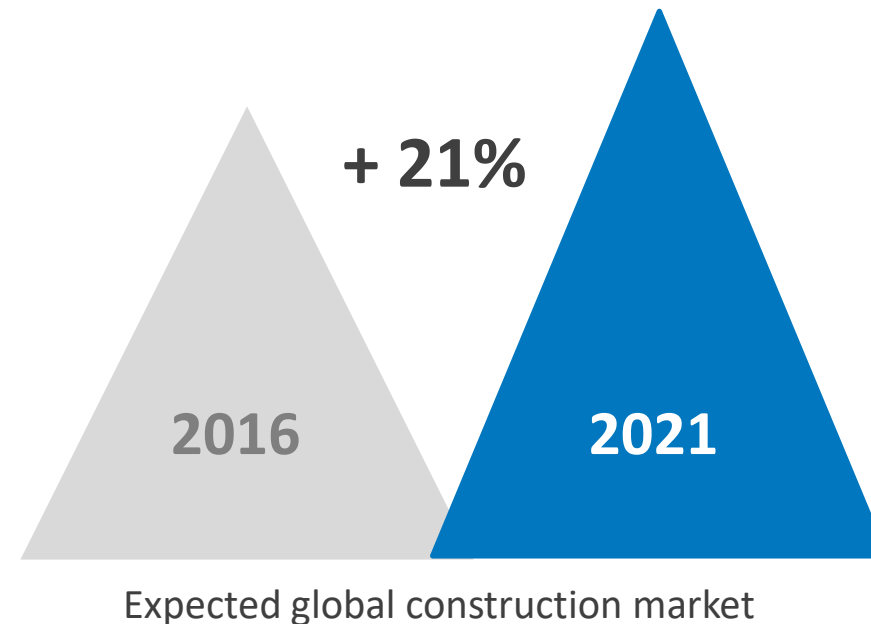
Civil and Structural  
Engineering

# Composites in Buildings and Infrastructure



# Construction Industry Size

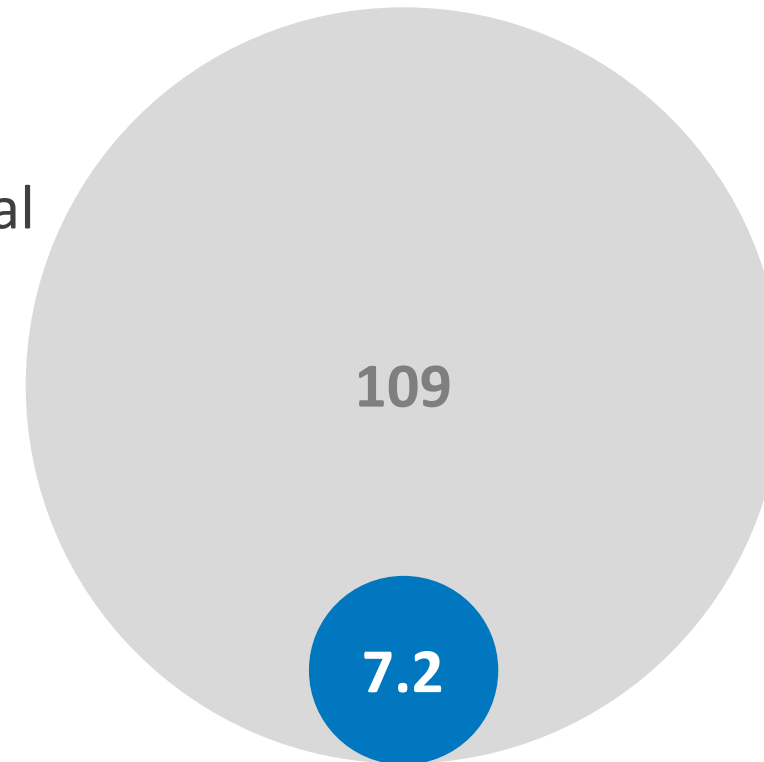
- Construction industry **regaining growth** momentum
- Construction market currently worth **€6.8 trillion** and has an expected **CAGR of 3.9%** per year until 2030





# Composites Market Share

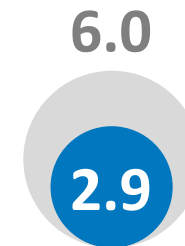
- 6.6% market penetration for composite materials in the construction and industrial sector



Construction and Industrial  
Material Market Value in  
Billions €

# Composites Market Share

- 48% market penetration for composite materials in the wind and tidal sector



Wind and Tidal Material  
Market Value in Billions €

# Rail Safety Standards

## Improving safety with pedestrian bridge replacements

- Level crossings were part of a network built 180 years ago
- If you were to build a railway today it would not have any level crossings. For example, HS1 does not have any level crossings
- UK level crossing fatalities, Network Rail (2014/15) 7, (2015/6) 3
- EU level crossing fatalities, Eurostat (2016) 256
- Safety and social responsibility
- Reduction of the liability costs to finance the foot bridges replacements

## UK Market Analysis - Level Crossing Replacement

- 6,503 level crossings
- 40% replaced by bridges
- 2,600 potential new bridges by Network Rail (NR)
- 76 replaced per year (2016 value)

Consortium members and expertise



# Materials Suppliers



# Composite Railway Footbridge



# Drivers for FRP Bridges

## Aesthetics

- Greater range of aesthetic options
- Less material usage allows for a **sleeker** design

## Modularity

- **Adaptable** design allowing a range of bridges applications based on the same components
- **Innovative solutions** for operations and maintenance bridging the gap of the composite sector
- **Installation**
- Footbridges required in rural locations and therefore **access limited**
- **Low weight** bridge allows for **on track delivery** and installation
- **Lower** track **possession** time

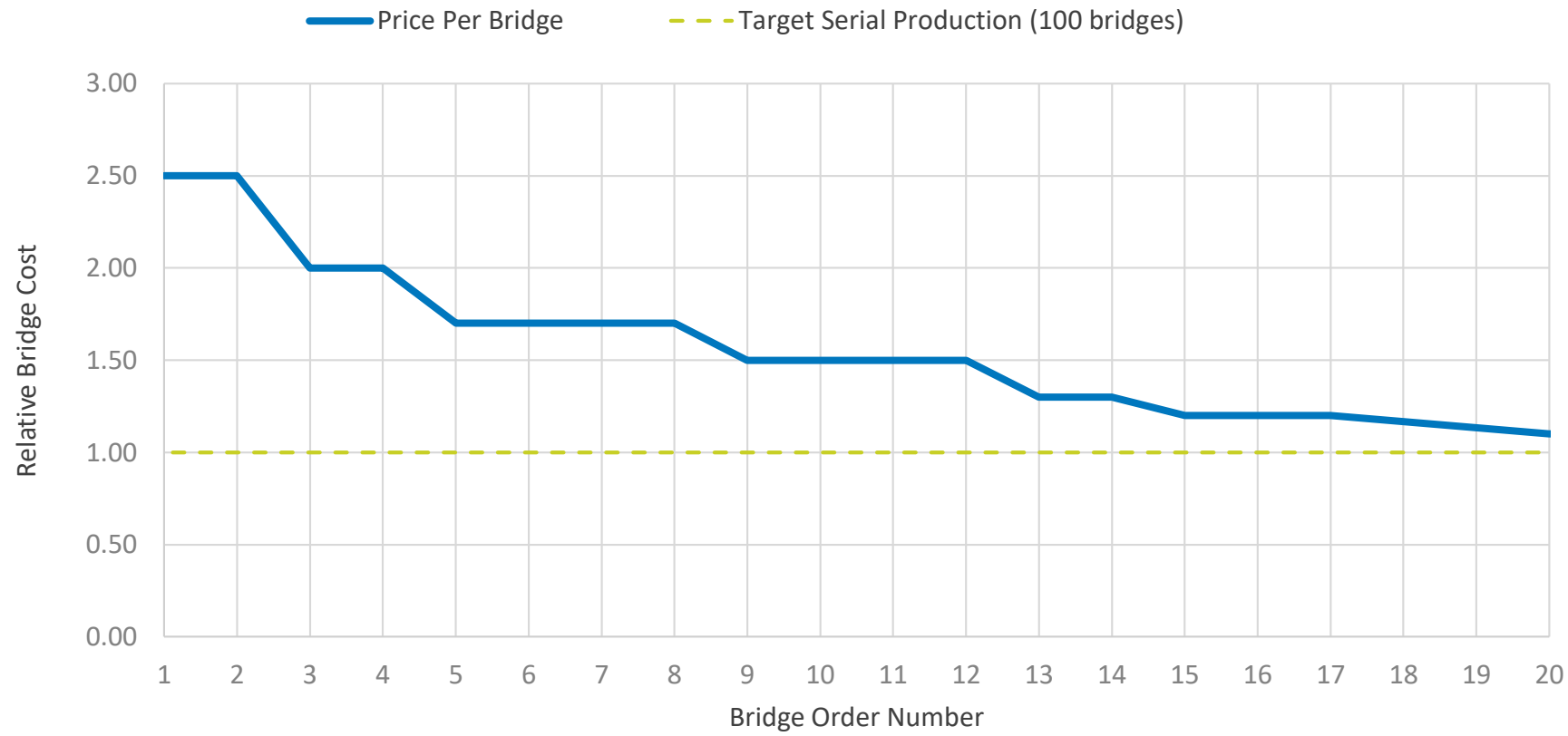


# Financing Solutions

## Leased Footbridge Procurement Option

- Serial price for 100+ bridges
  
- Bridge with stairs
  
- Maintenance costs included over 20 years
  
- Network Rail Level Crossings
  - ⊗ Around 600 high risk level crossings
  - ⊗ 6500 total crossings
  - ⊗ Liability costs => These costs will link to the number of level crossings to be replaced each year

Price per Bridge based on order quantity  
(with Stairs)



## Option 1 - Purchase

- Target replacement of 60 per year

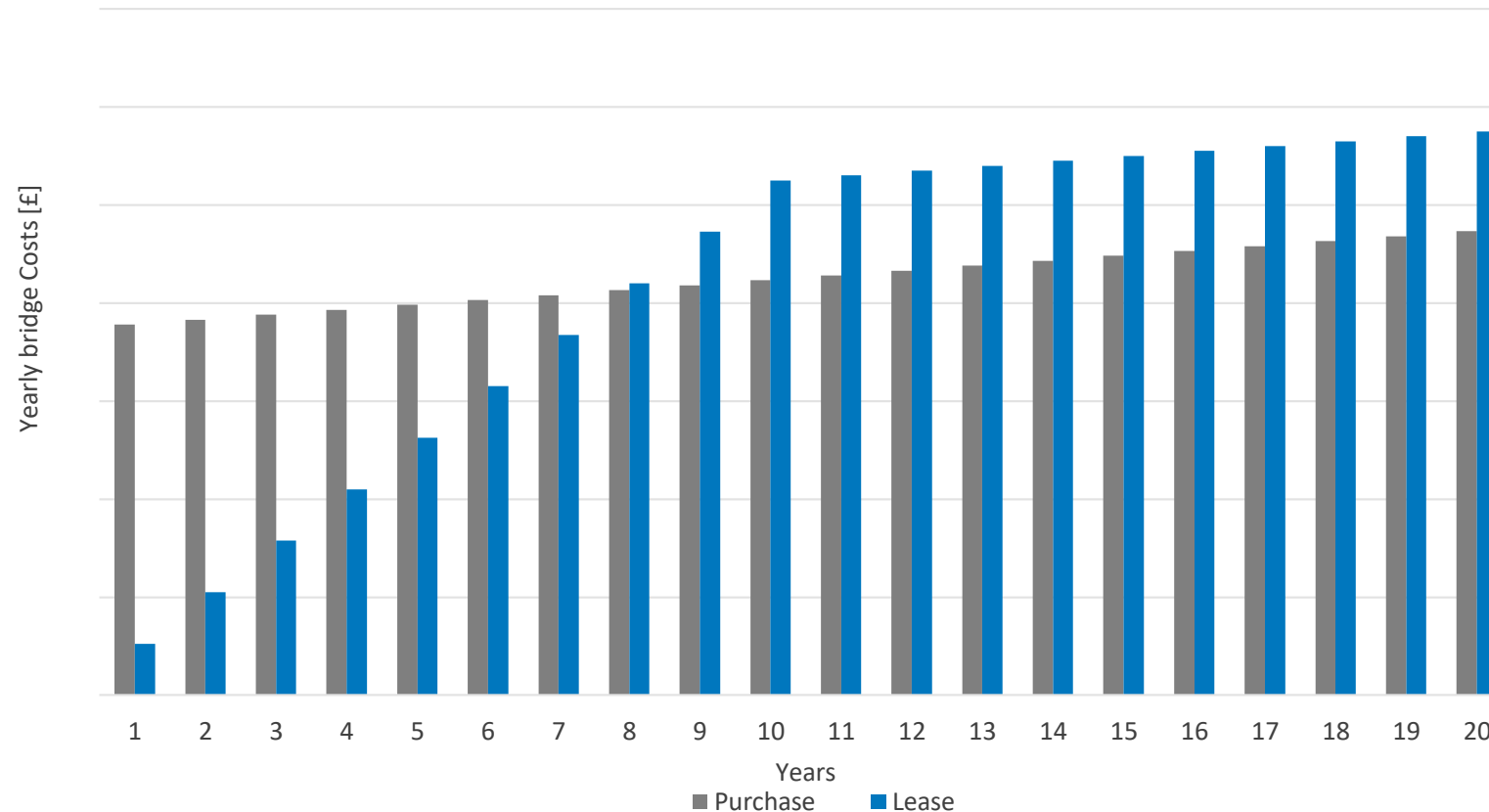
## Option 2 - Finance or Leasing

- Finance model
  - ⊗ Low Interest - Institutional Finance option
  - ⊗ High Interest - Private Finance option
  - ⊗ Payments over 10 year period
  - ⊗ Maintenance can be included in lease or managed separately depending on end user requirements

## Option 2 - Finance or Leasing for stair bridge with institute interest rate

- Finance model - 10 year payback

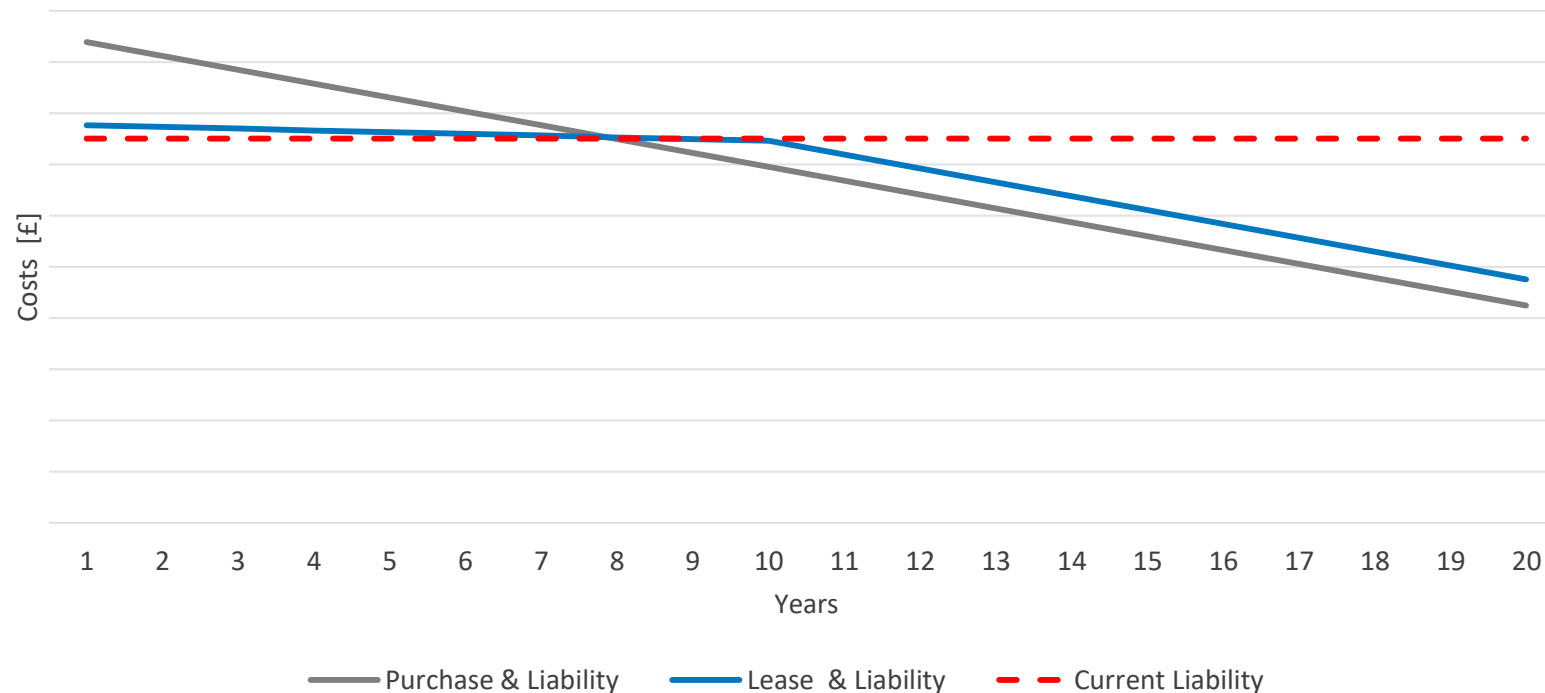
Yearly Bridge and Maintenance Costs for 60 Bridges



## Option 2 - Finance or Leasing for stair bridge with institute interest rate

- 60 bridges per year for 10 years
- Finance model - 10 year payback
- Liability reduced by 25% over 20 Years (600 replacements over 2600 Level crossing closures)

Total Yearly Costs, Including Reducing Liability Costs

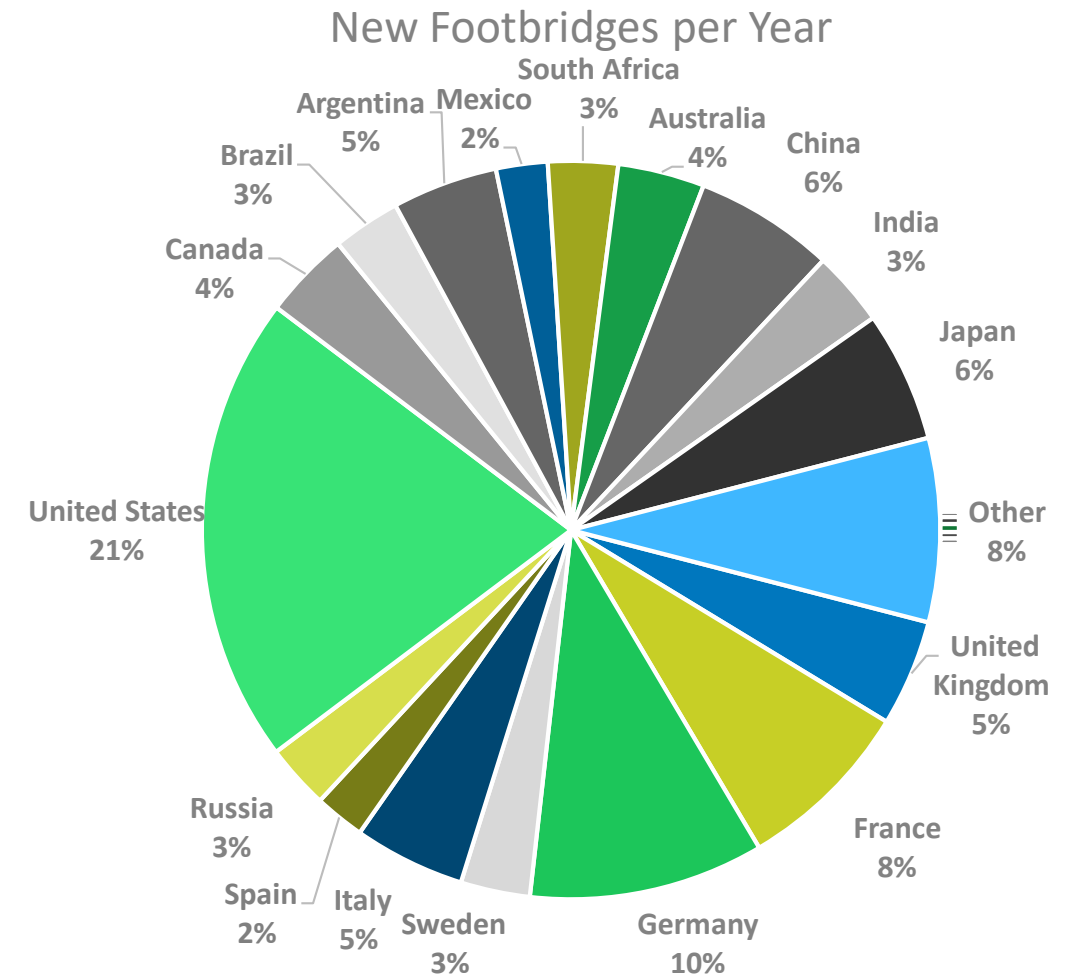


# Projections

## ‘Further down the track’



- Fatalities at level crossings in other European higher than compared to UK
  - ⊗ 114,580 level crossings across Europe
  - ⊗ European Union goal to eliminate level crossings
  - ⊗ Level crossings are currently reducing at a rate of 4% per year
- Expanding world railway markets
  - ⊗ Bridges can be designed out of new railway infrastructure



# Conclusions

## Conclusions

- Using composite footbridges allows rail operators to overcome installation issues and therefore cheaper to replace rural level crossings
- Leasing bridges allows faster level crossing replacement whilst remaining cost neutral due to the reduced liabilities
- This concept can be expanded to new and emerging markets to imprint improved safety from the beginning





## Questions?

**Julien Sellier**

Julien.Sellier@structeam-ltd.com

**STRUCTeam**

www.structeam-ltd.com

+44 (0)1983 240534