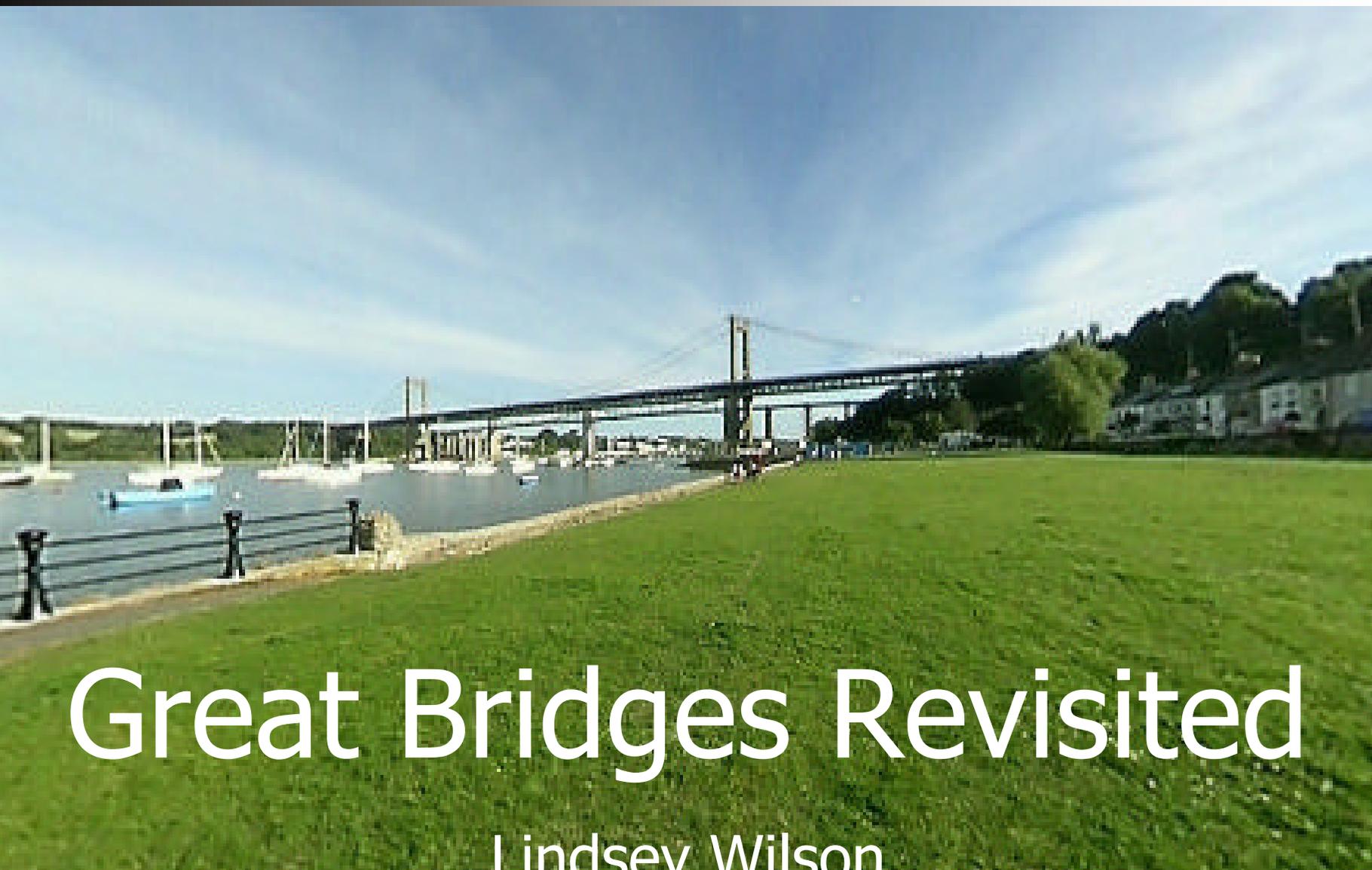


Bridge Owners' Forum



Great Bridges Revisited

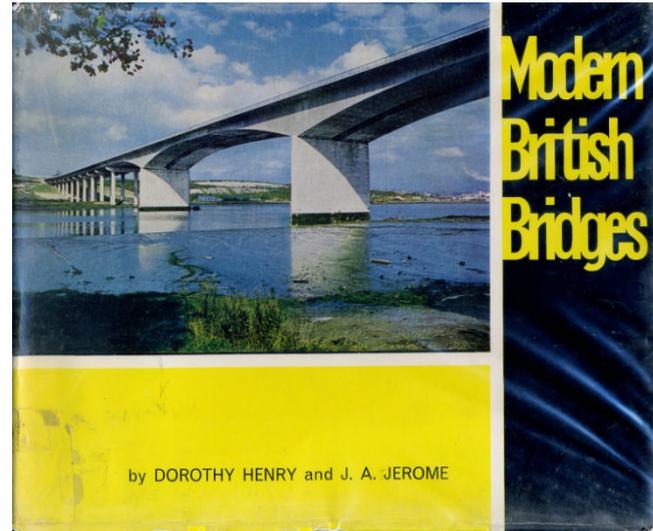
Lindsey Wilson

Contents

- Basis for Project
- Project aim
- Bridge statistics
- Lessons Already Learnt
- Findings
- Conclusions
- Further Work
- Questions

Modern British Bridges

- Published 1965
- ~ 100 bridges
- Remarkable claims



- But, we know –
many bridges have had significant problems

Forth Road Bridge



- Listed Structure
- Strengthened
- Hangers replaced
- Cable corrosion
- Forth Replacement Crossing

Severn Suspension Bridge

- Listed Structure
- Strengthened
- Cable Corrosion
- Second Severn Crossing
- Pier Protection
- Weight restrictions



Queenhill Bridge

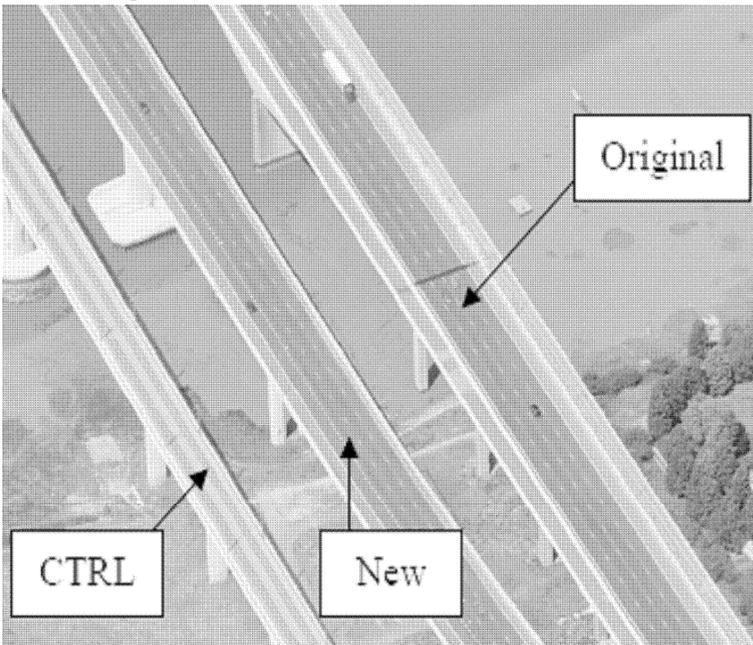
- Chance inspection
- Hanger failure
- Emergency closure

- Mianus Bridge, Connecticut
- 3 fatalities



Medway Bridge and Viaducts

- Central span
- Strengthened
- Adjacent structure



Quotes

“If [this book] has a message to impart it is – quite simply one of pride in the men who have created our modern British bridges.”

“The year 1967 will complete a momentous decade for British road builders.”

Quotes

“The great renaissance of bridge building was on its way. The results were to be prodigious.”

“I count myself fortunate that the launching of a great period of British road building has come in my time.”

Quotes

“British engineers have used their **inherited genius** to make advances on both national and international designs.

Once again we can claim to be in the **forefront of design** and in a **position to advise and help** those with bridge problems overseas.”

Project Aim

- **What can we learn?**
- **Identify bridges**

<http://tinyurl.com/britishbridges>



Project Aim

- **What can we learn?**
- Identify bridges
<http://tinyurl.com/britishbridges>
- Contact bridge owners
- Gather information
- Draw conclusions



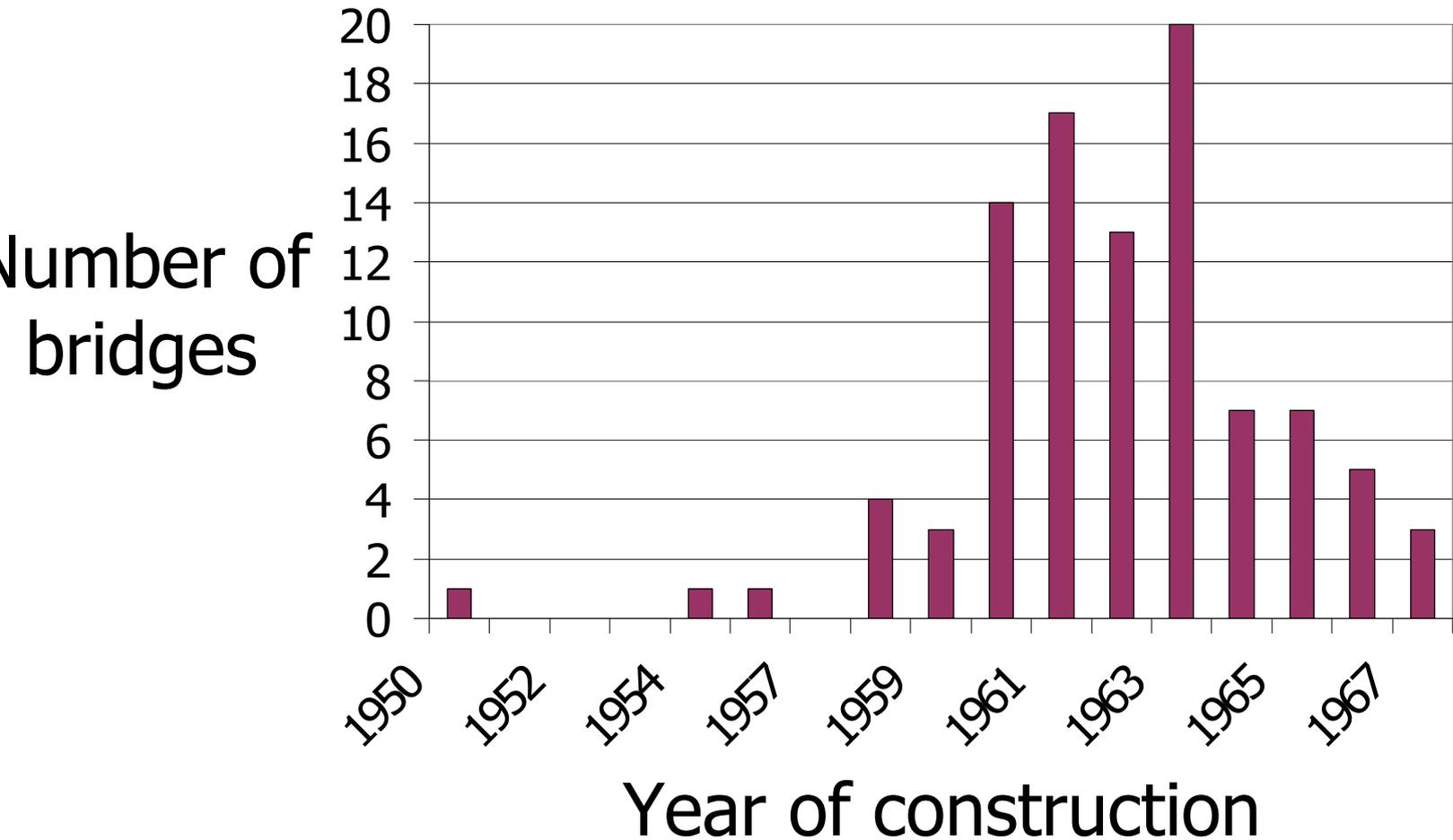
Bridge Statistics

| Country | Number of Bridges |
|------------------|-------------------|
| England | 79 |
| Wales | 8 |
| Scotland | 12 |
| Northern Ireland | 4 |
| Total | 103 |

Bridge Statistics

| Ownership | Number of Bridges |
|--|-------------------|
| Highways Agency | 58 |
| Transport Scotland | 2 |
| Welsh Assembly Government | 8 |
| Local Authorities/Private Owners | 27 |
| Department for Regional Development (NI) | 4 |
| Network Rail | 4 |
| Total | 103 |

Bridge Statistics



Lessons Already Learnt

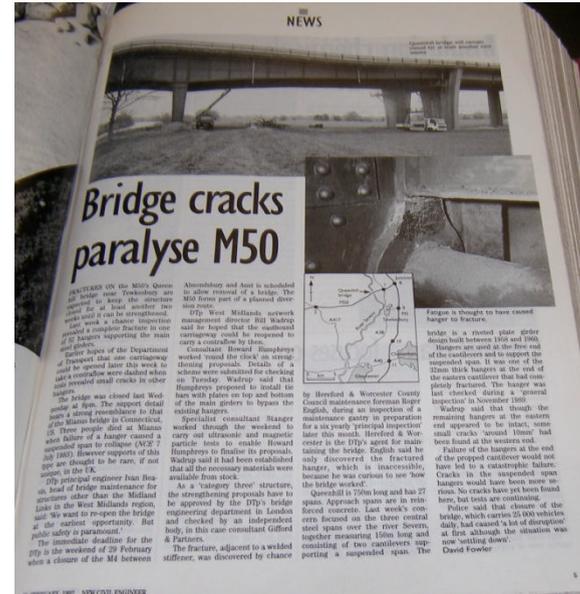
- Half-joints
- Integral structures
- Concrete not maintained
- Consider future maintenance requirements
- Whole Life Costing



Findings

- Inspection Reports
- Papers
- Articles

1. Structural Observations
2. Condition
3. Management Observations



1. Structural Observations

| Action | Number of Bridges |
|-------------------------|-------------------|
| Demolished (redundant) | 4 |
| Demolished and replaced | 3 |
| Parallel Structures | 9 |
| Widening | 4 |
| Strengthened | 21 |
| Total | 103 |

- Lack of forward planning

1. Structural Observations



Barton High Level Bridge

- Three lanes needed
- Two lanes built
- Widened

1. Structural Observations

- Major elements replaced
 - Decks
 - Spans
 - Piers



1. Structural Observations

Clifton Bridge

- Parallel structure
- Strengthened



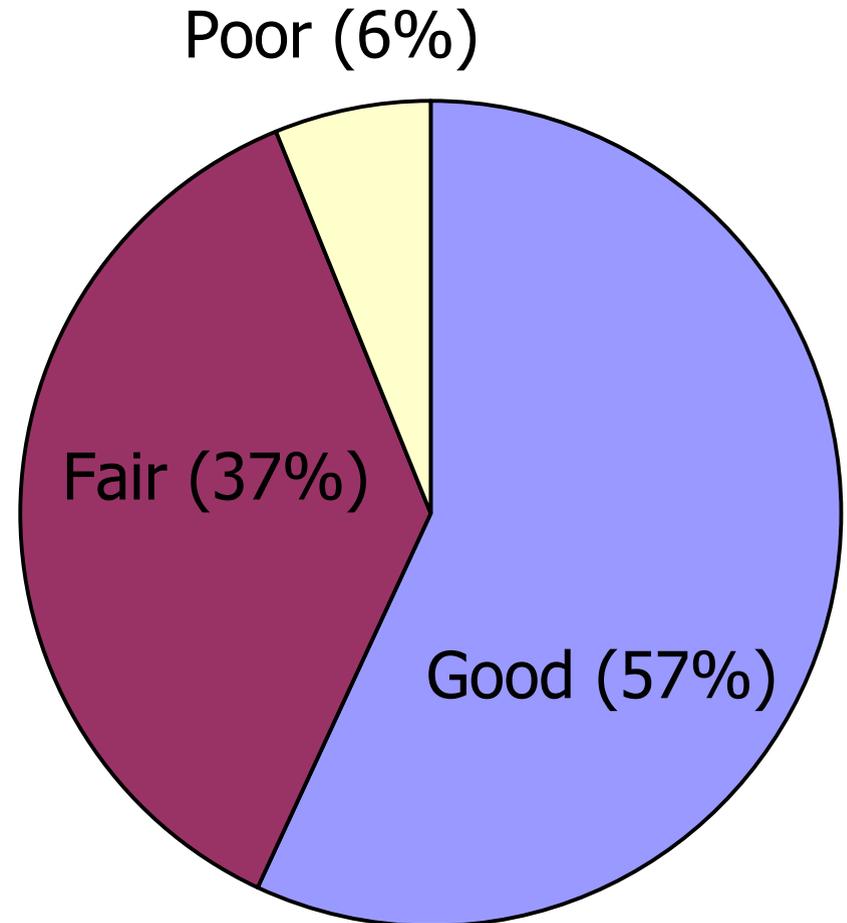
1. Structural Observations

- Major elements replaced
 - Deck
 - Central span
 - Piers
- Bearings
- Waterproofing
- Expansion joints



2. Condition

- Good / Fair / Poor
- Spalling / Exposed re



2. Condition

- Good / Fair / Poor
- Spalling / Exposed reinforcement
- Poor workmanship



2. Condition

- Good / Fair / Poor
- Spalling / Exposed reinforcement
- Poor workmanship
- Inadequate routine maintenance

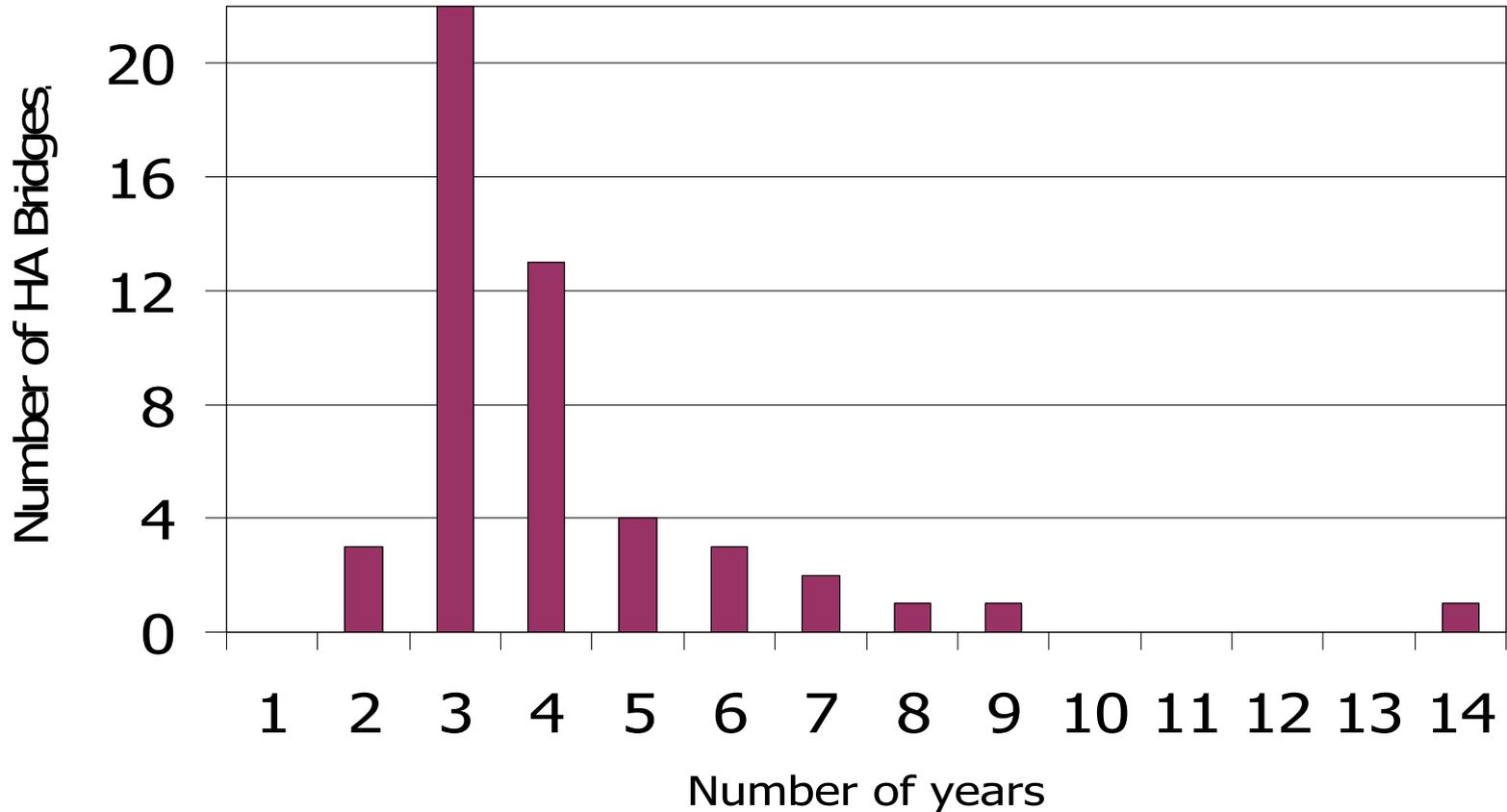


3. Management Observations

- Lack of Records
- Inspection Frequency

3. Management Observations

Years without an Inspection



3. Management Observations

- Lack of Records
- Inspection Frequency
- Competency of Inspectors
- Subjectivity of Inspections
- Quality of Inspection Reports
- Recommended maintenance actions

Conclusions – What can we learn?

- Held in high regard
- Required significant work
- Consider future requirements
 - Maintenance and inspection access
 - Traffic increase



Conclusions – What can we learn?

- Avoid half-joints and joints
- Cover to reinforcement
- Accessibility
- Whole life costing
- Better regulation
- Bridge inspector training
- Review inspections
- Implement system for storing information

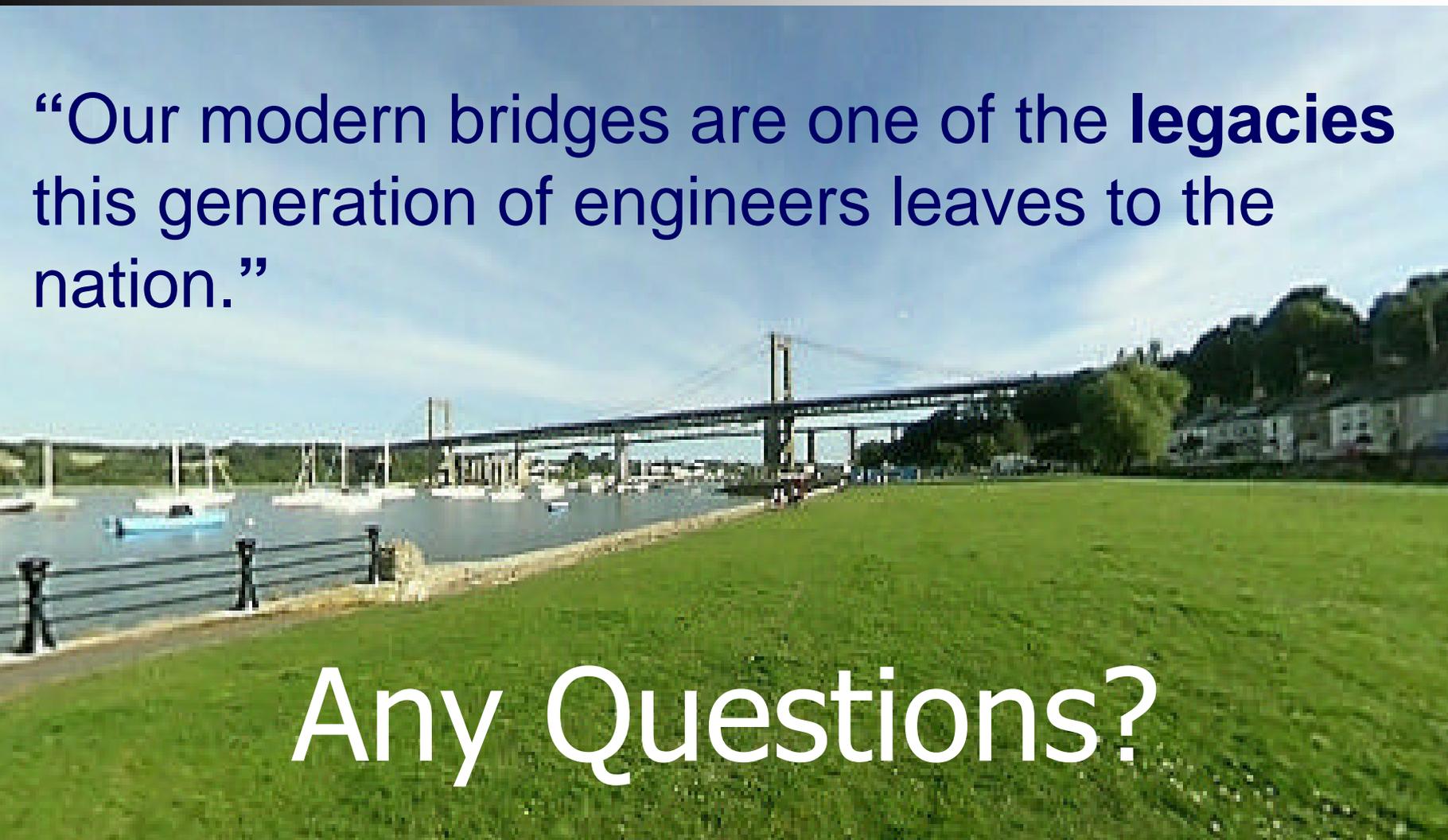


Further Work

- Larger sample of bridges
- Different designs
- Total costs of structures
 - Construction + Maintenance + Inspection

Questions

“Our modern bridges are one of the **legacies** this generation of engineers leaves to the nation.”



Any Questions?