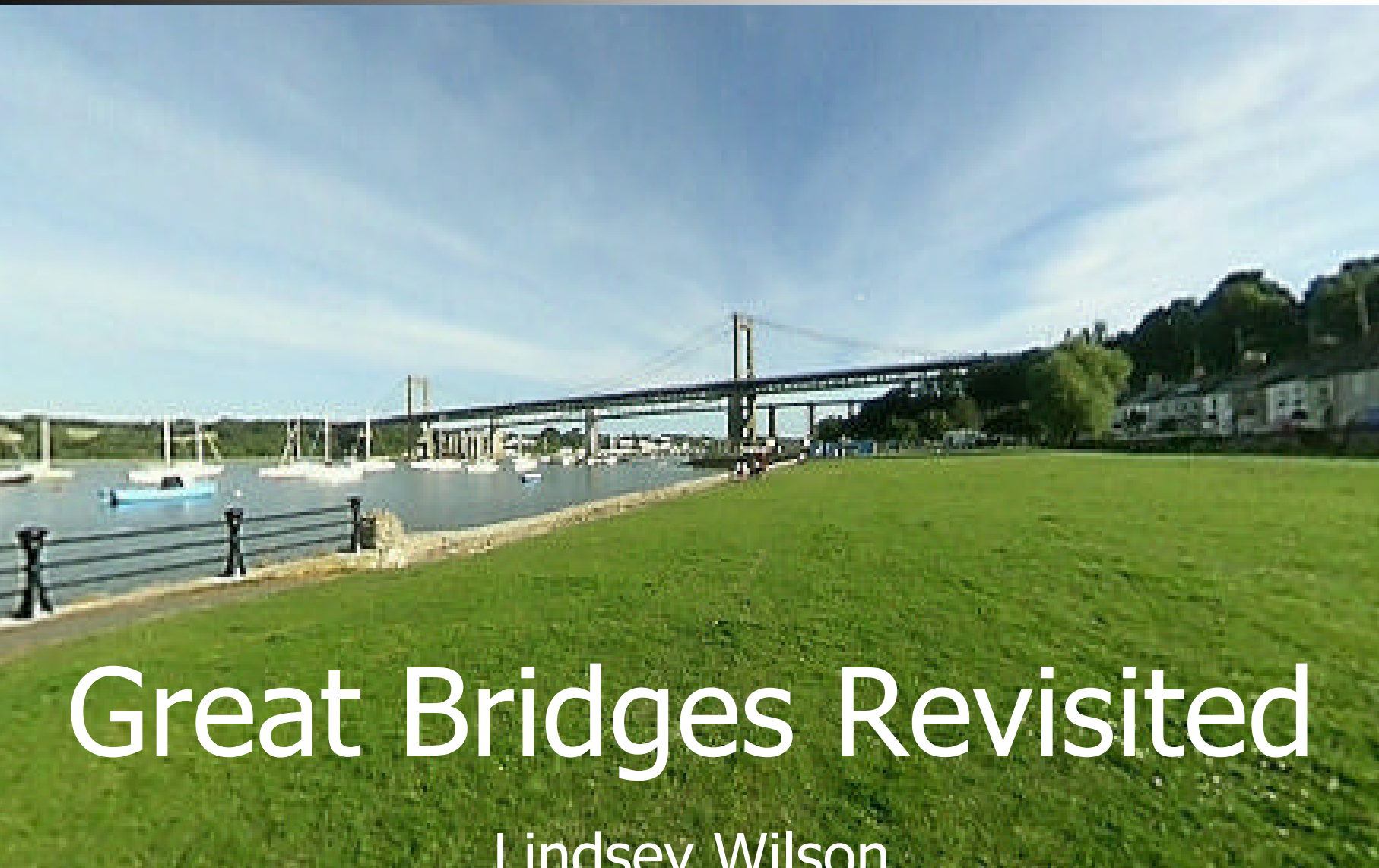


# Bridge Owners' Forum



## Great Bridges Revisited

Lindsey Wilson

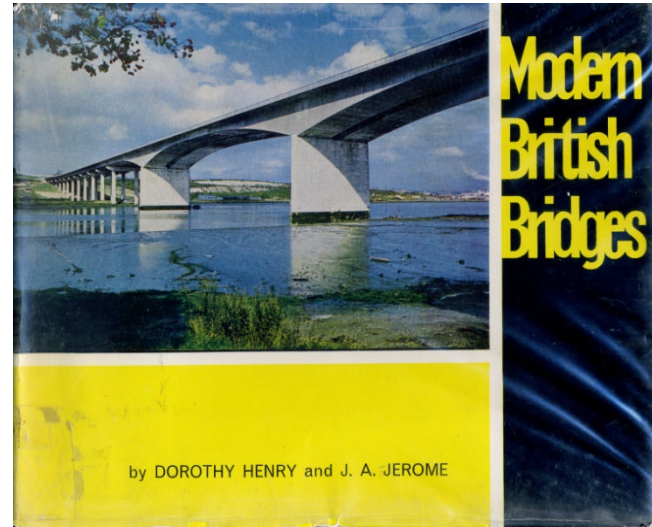
# Contents

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- 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



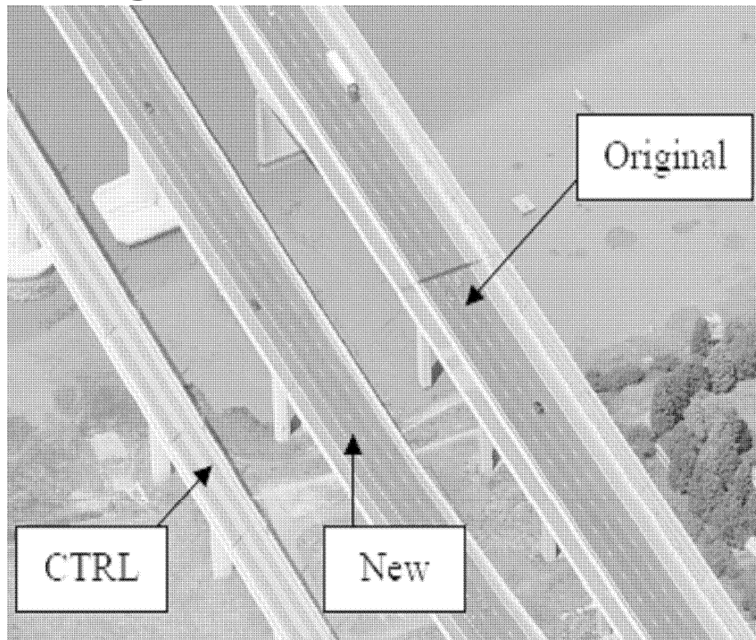
# Queenhill Bridge

- Chance inspection
- Hanger failure
- Emergency closure
- Mianus Bridge, Connecticut
- 3 fatalities



# Medway Bridge and Viaducts

- Central span
- Strengthened
- Adjacent structure



# Quotes

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“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

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“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

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“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



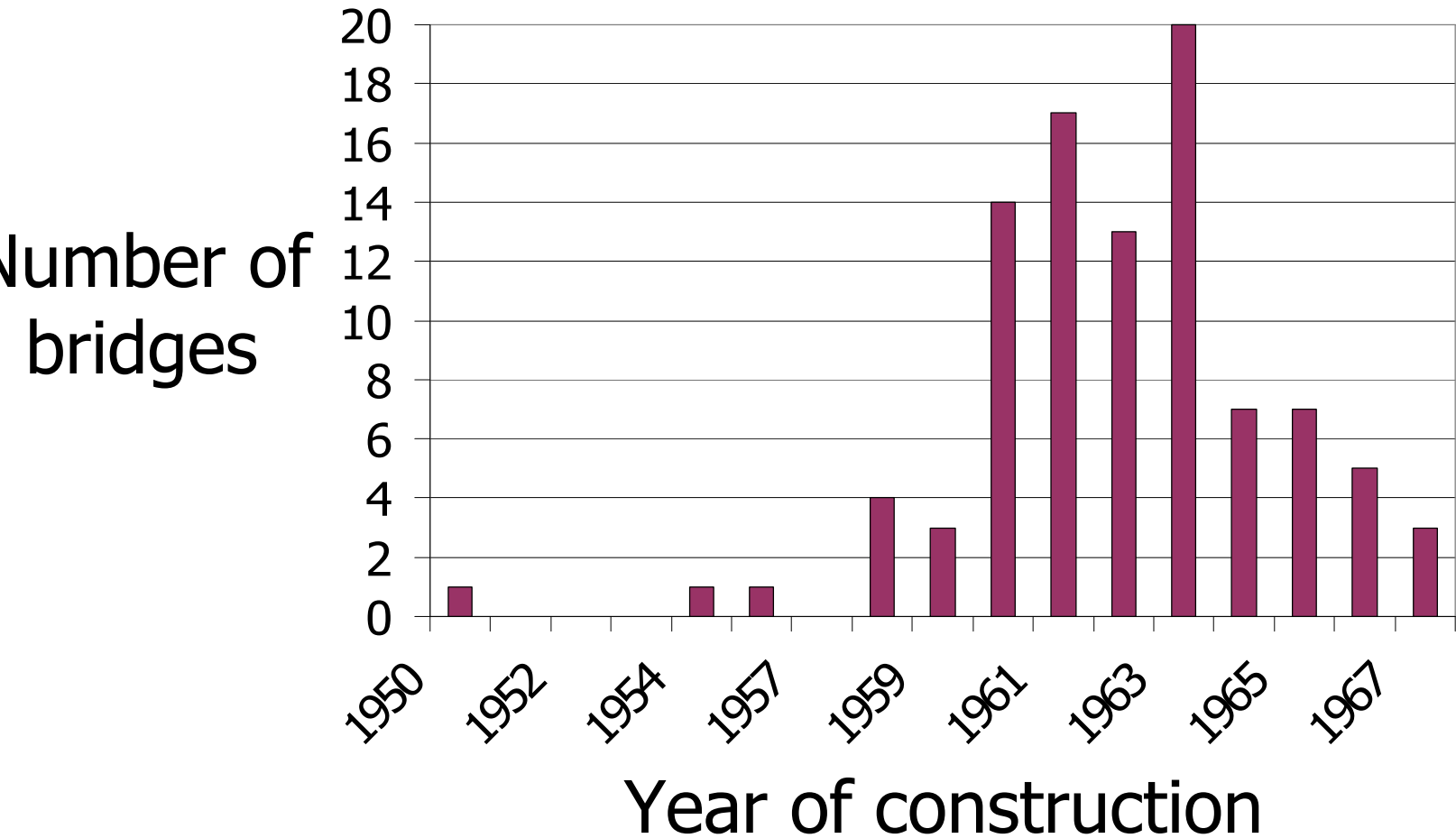
# Bridge Statistics

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



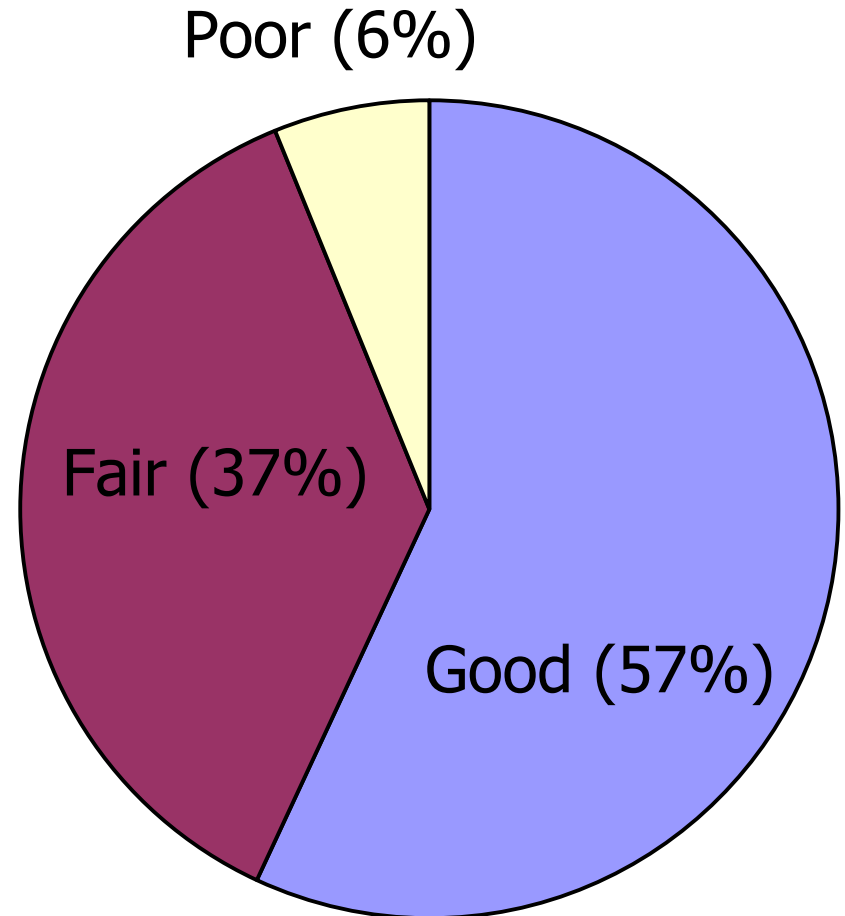
# 1. Structural Observations

- 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



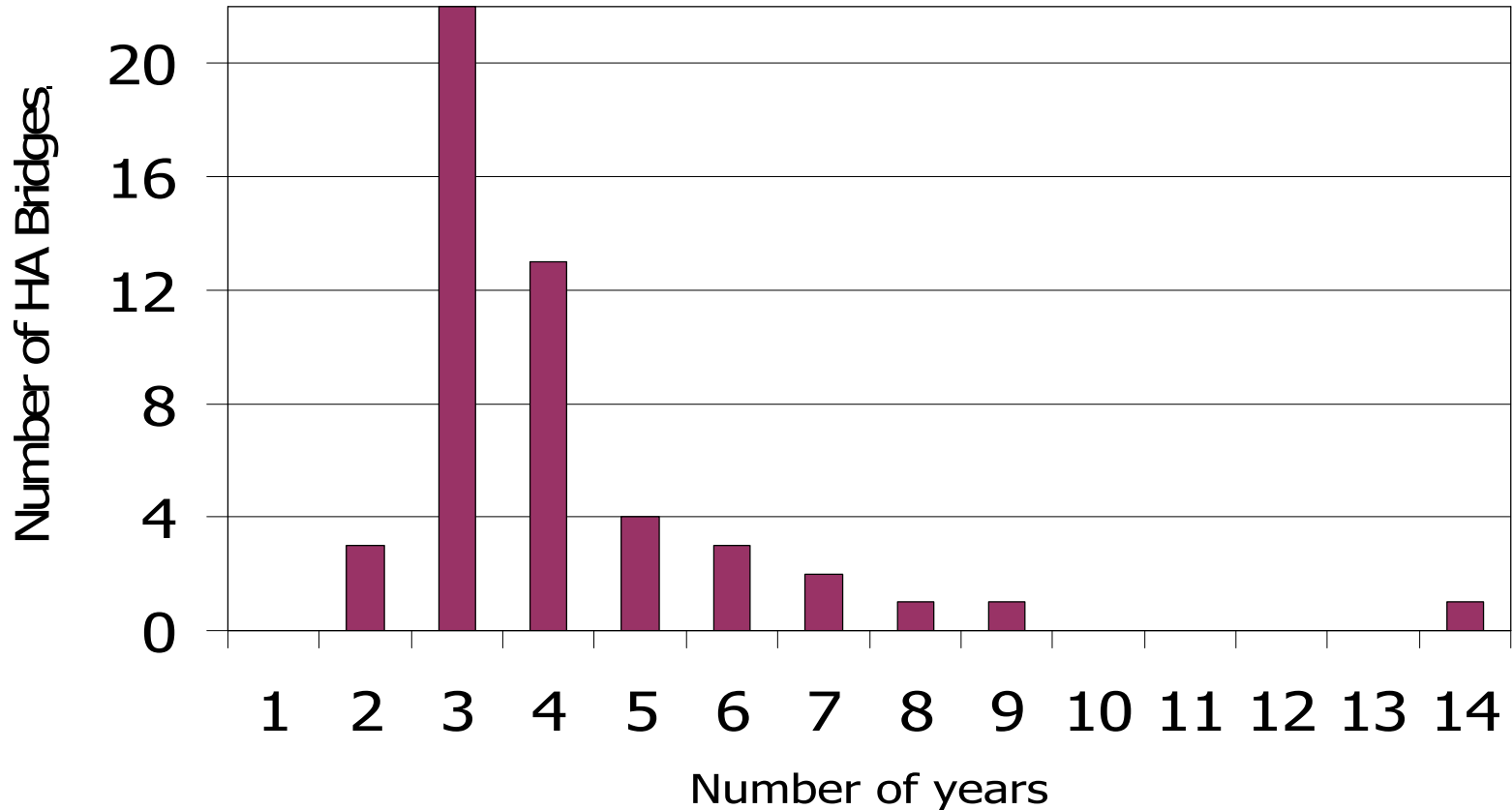
# 3. Management Observations

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- Lack of Records
- Inspection Frequency

# 3. Management Observations

## Years without an Inspection



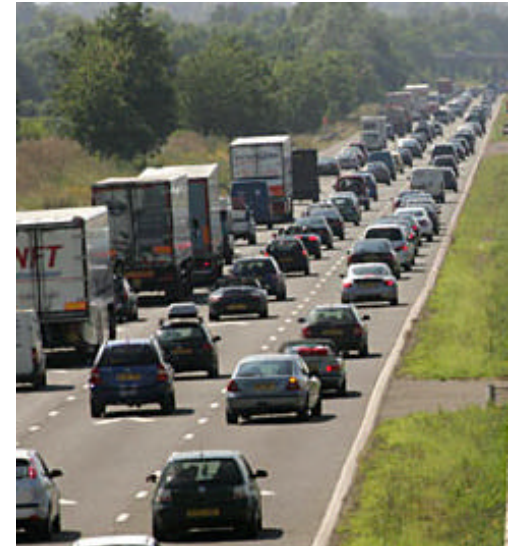
# 3. Management Observations

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- 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

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- 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?