Load Testing of a 1920’s Reinforced Concrete Bridge

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Arden Street Bridge
Arden Street Bridge

- City of Melbourne
- Moonee Ponds Creek
- 1923
- Reinforced Concrete & Monier Pipe Co.
- £4,825
- 8 months
Arden Street Bridge
Arden Street Bridge
CARBON FIBRE
STEEL ANGLES
Chemical anchors and slotted holes
Chemical anchors and slotted holes
Load testing _ AS5100 (2004)

- Method of evaluating the performance and structural capacity of a bridge

- Destructive testing

- Non-destructive testing
  
  • Performance load testing
    
    *Serviceability limit state test*
  
  • Proof load testing
    
    *Maximum load without inducing non-linear behaviour*
Performance load testing (Stage 1)
Performance load testing (Stage 1)
Performance load testing (Stage 1)
Performance load testing (Stage 1)
Proof load testing (Stage 2)
Proof load testing (Stage 2)
Proof load testing (Stage 2)
Proof load testing (Stage 2)
Instrumentation

STRAIN GAUGES
SLIP MEASURING LOAD CELLS
Instrumentation

LINEAR POTENTIOMETERS
Instrumentation

DATA LOGGER
Results _ Stage 1 _ 2 x 54.5t Trucks

Midspan deflection due to live load

Results compare well to Spacegass model
Results _ Stage 2 _ Test 1

Point load applied to Beam 2 at midspan

DEFLECTION (mm)

TIME

Beam 1  Beam 2  Beam 3

44 tonne point load
Results _ Stage 2 _ Test 2

Point load applied to Beam 2 near pier

![Graph showing strain over time with 48 tonne point load indicated]
Results _ Stage 2 _ Test 2

Point load applied to Beam 2 near pier

Tee beam section effective
HLP movements
HLP movements
Key points

- Strong bridge!
- Importance of As-Built records
- Risk due to latent conditions
- Physical load testing successful
- Planning and coordination
- Roles and responsibilities
Acknowledgements

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Thank you!