

## Further Results from Using GPS to Monitor the Deflections of the Forth Road Bridge

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- The Bridge
- The Trials
- Specific Tests
- Results
- Conclusions

## The Forth Road Bridge

- Built in 1962
- Overall length of 2.5km
- Main span length of 1,005m
- 4 million vehicles in 1964
- Over 23 million in 2002
- Lorries 22tonnes to 44 tonnes

## The Field Trials

- 8 February 2005
- 46 hours of data
- 7 GPS receivers upon the bridge
- Leica SR 530/510 and GX1230
- 2 Reference Receivers
- Also an Aplanix INS

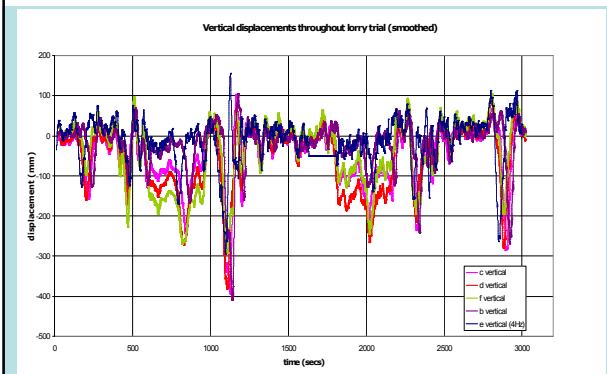
## Antenna Locations



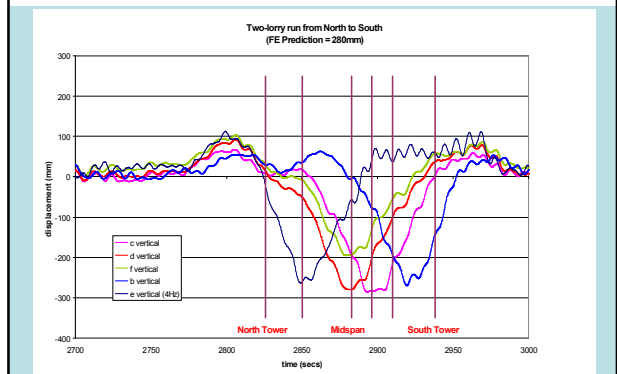
## Lorry Trials

- Took place overnight
- 2 x 44 tonne lorries
- Various Manoeuvres
  - 1 lorry ran from North to South
  - 1 lorry ran from South to midspan on west side, stopped then the other lorry moved north to south
  - 1 lorry moved from north to south and stopped at midspan, other moved south to north
  - 1 lorry moved from south to north, and then both moved side by side north to south

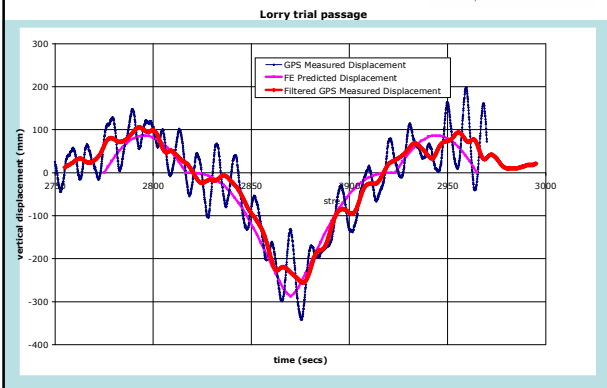
## Vertical Displacements



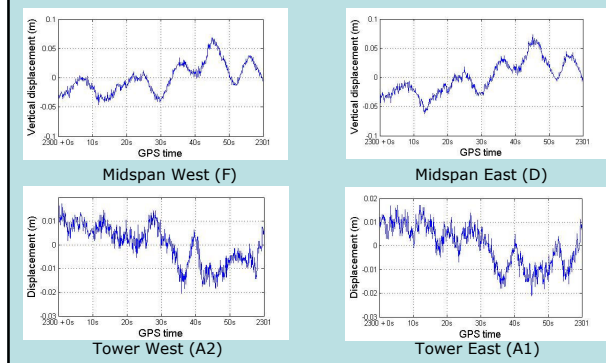
## Vertical Displacements



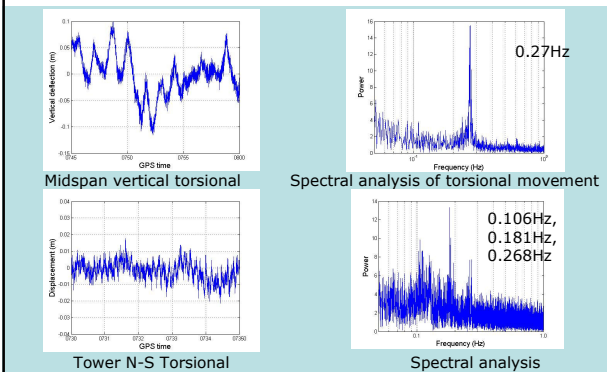
## Vertical Displacements



## Tower vs Deck



## Torsional Movement



## Conclusions



- Trials shown the feasibility of GPS on such structures
- Synchronized and 10 Hz
- Real time possible
- FEM v GPS or FEM + GPS

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- and



**Brunel**  
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