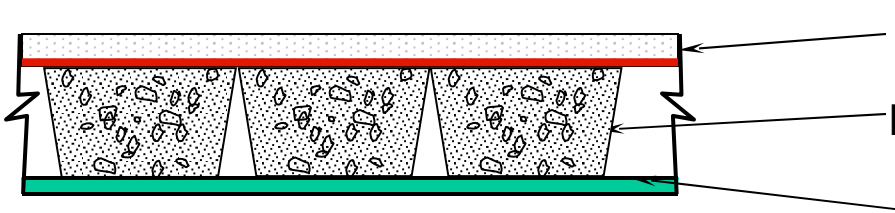
Queen's University Belfast

MACRETE
PRECAST CONCRETE ENGINEERS

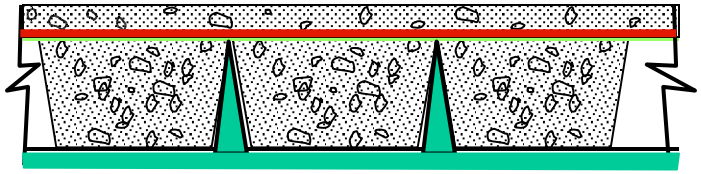
The Flexible Concrete Arch

A new version of the traditional masonry arch

Method of construction

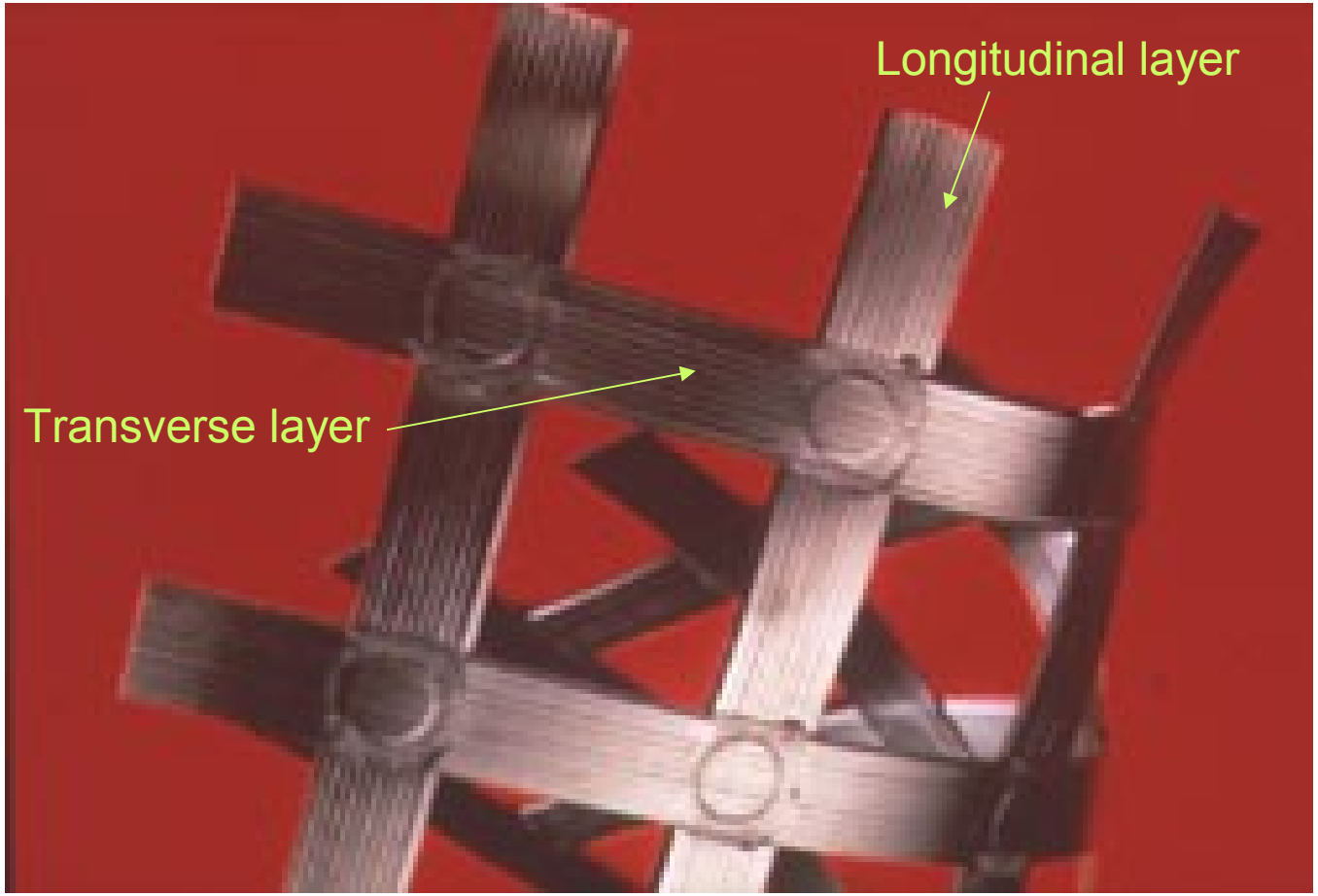


(a) Construction of arch unit using precast individual voussoir concrete blocks



(b) Monolithic Construction of arch unit using precast wedges

Polymer Reinforcement



Prototype skew arch

Case study -Tievenameena Bridge

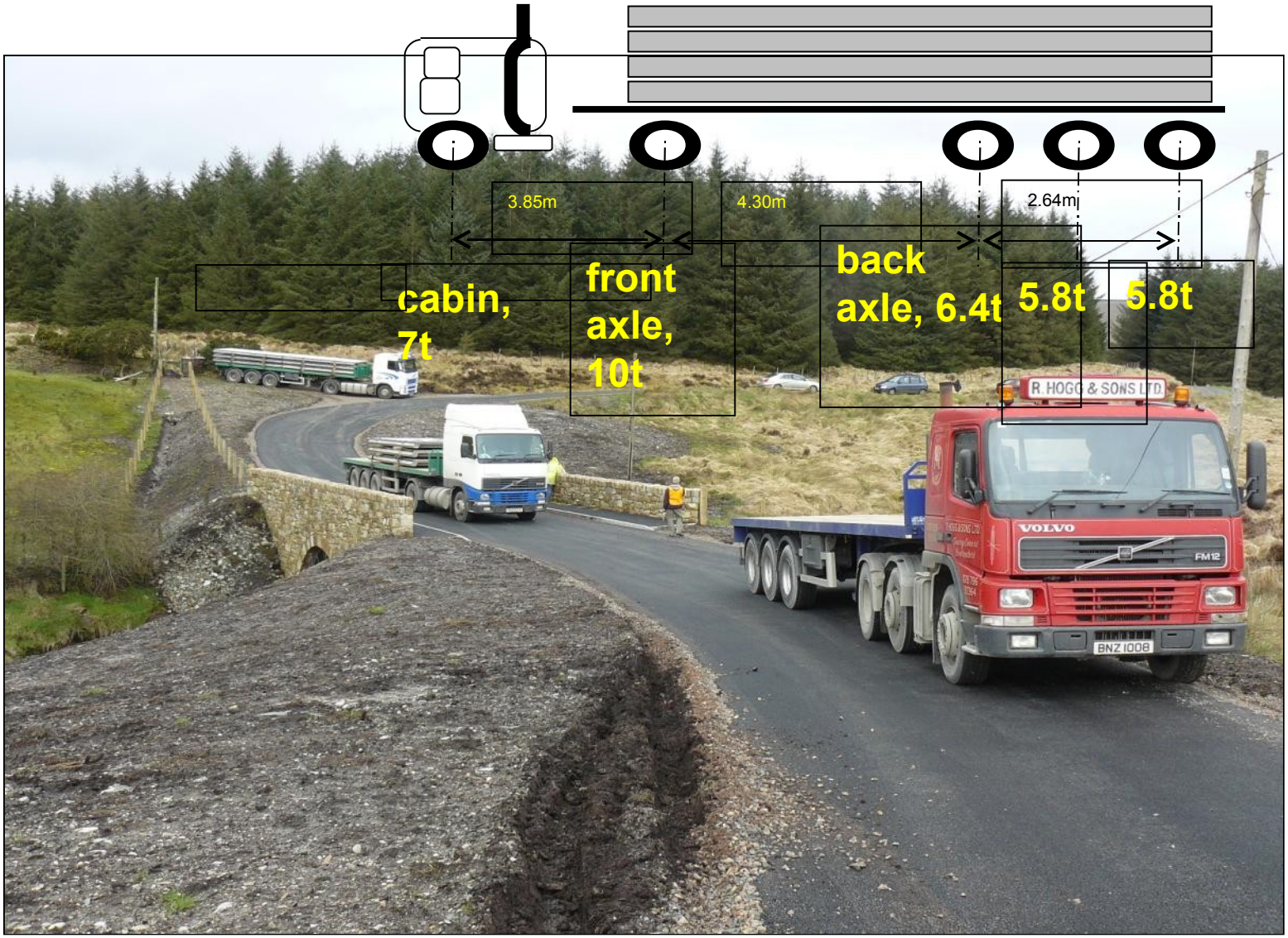

M.J. Mc KIN
CRANE HIRE


BROGAN


HITACHI


Tievenameena Bridge

Load testing

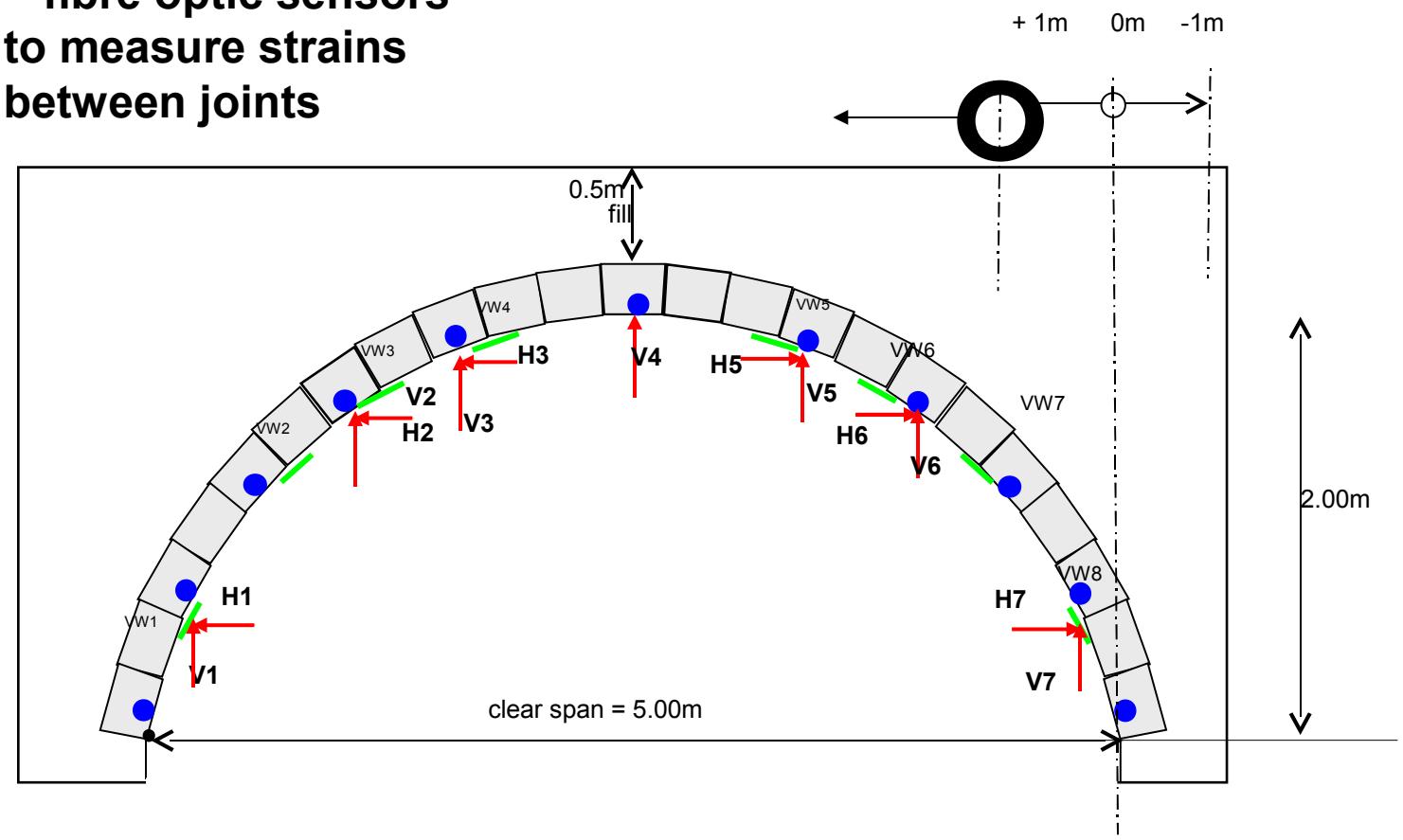


= transducers

= vibrating wire gauges

= fibre optic sensors to measure strains between joints

centre of axle load moved to critical locations



Testing results

- **No cracking occurred**
- **Spandrel wall was monitored during the test**
- **Very low strain values in the arch ring**
- **Maximum change in deflection occurred in 4th arch ring under Test Load 5 (Truck 3 @ 2nd and 4th arch rings)**
- **Maximum deflection of 0.21mm, occurred when back axle at the midspan**
- **0.21mm is equivalent to effective span / 23433**