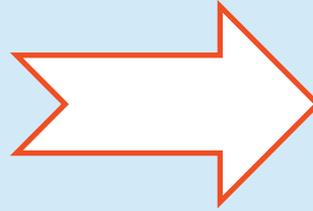

Digital BSALL

Bridge Owners Forum Presentation
Cameron Archer-Jones and Arfon Irish

Ageing bridge stock



Our aging bridges will increasingly not meet the requirements of modern codes.



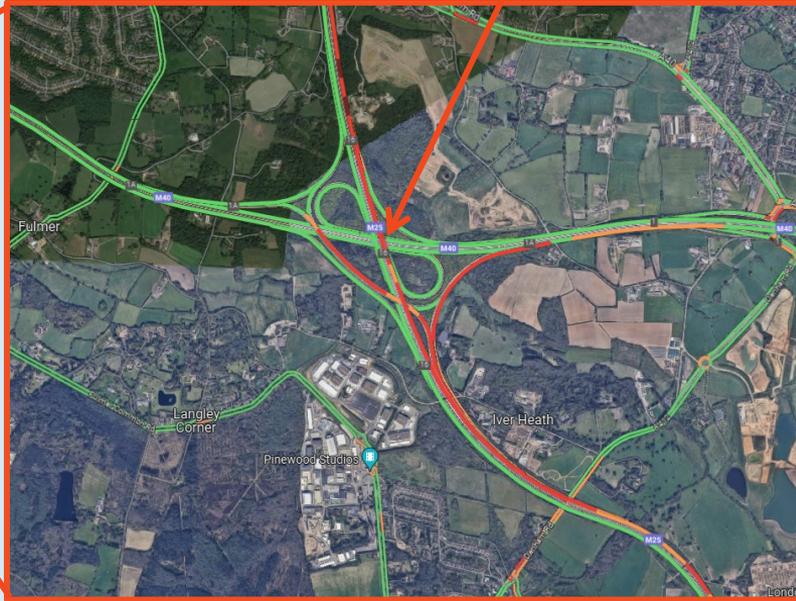
**Costly Strengthening
Or
Decommission and Replace**

Vision

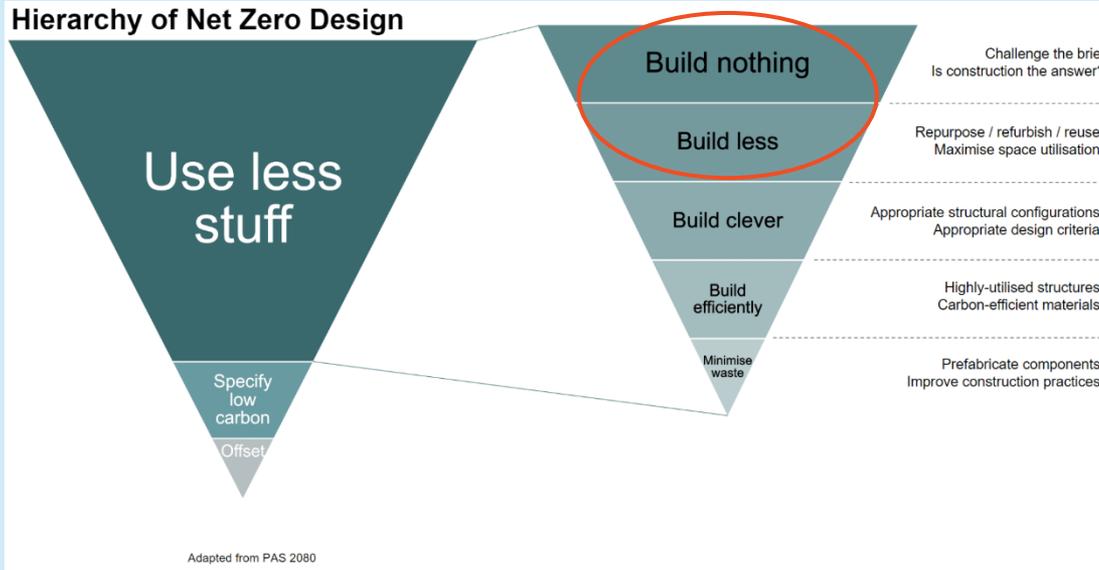


Bridge Loading – X% at
XX:YY:ZZ

Download Digital BSALL
loading data...



Carbon Saving



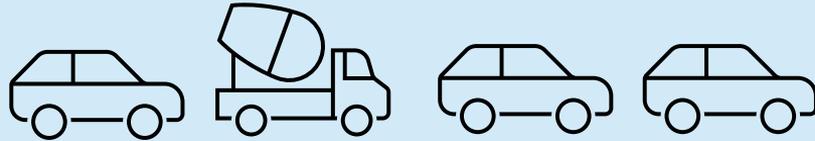
$$R_d \geq E_d$$

Traffic Loading by the codes

1 Single vehicle
or knife edge
load



2 Loaded length with mix of vehicles





Codified method

- Codes are conservative. They have to be!
- They assume the worst traffic mix.
- But most bridges are not just outside a timber mill and an amazon depot.



Assumed traffic mix

Our bridge



Digital BSALL

Real Traffic

- Real Traffic is a mixture of heavies and mostly light cars.
- Only barrier to using this is proving it!



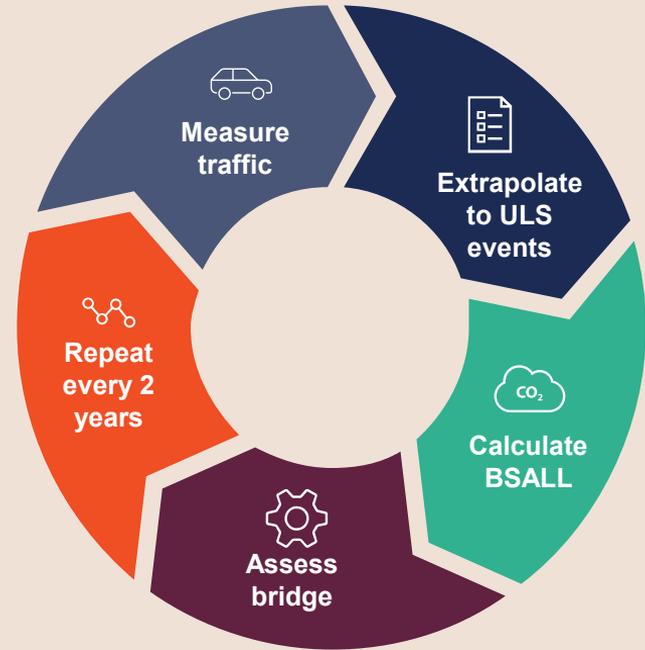
Assumed traffic mix



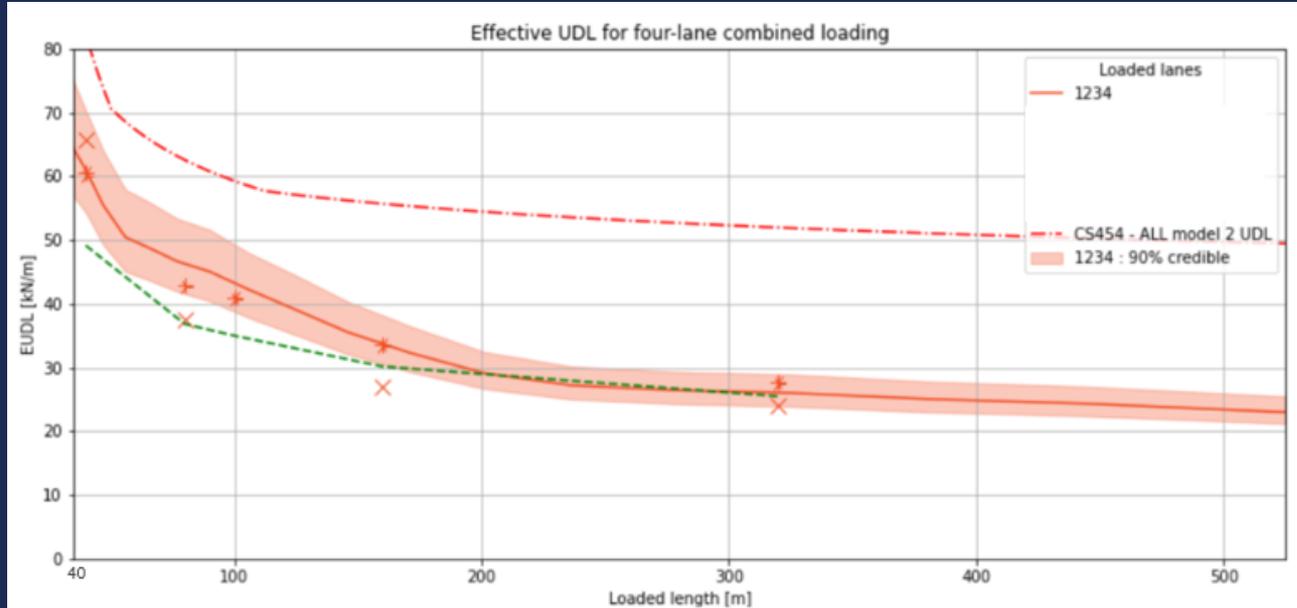
Our bridge

BSALL Process

- Measure traffic loads over ~3 months.
- Calculate custom assessment traffic loads (BSALL).
- Assess bridge.
- Repeat every 2 years.



Benefits of a BSALL



How to collect weights

We can measure traffic mix with a **Weigh in Motion Systems**.

Pros:

- Full information on weight of every axle.

Cons:

- Expensive to procure.
- Requires repeated calibration.
- Cannot resurface without disturbing.



The proposal

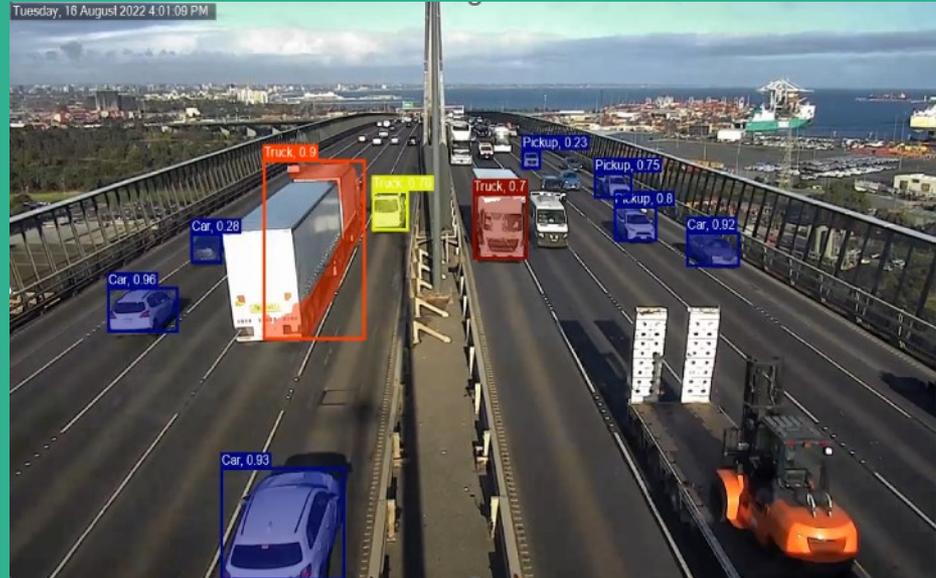
Use video feeds to identify vehicle types.

Pros:

- Only needs a video feed.
- Easily maintainable and cheap.
- No expensive calibration.

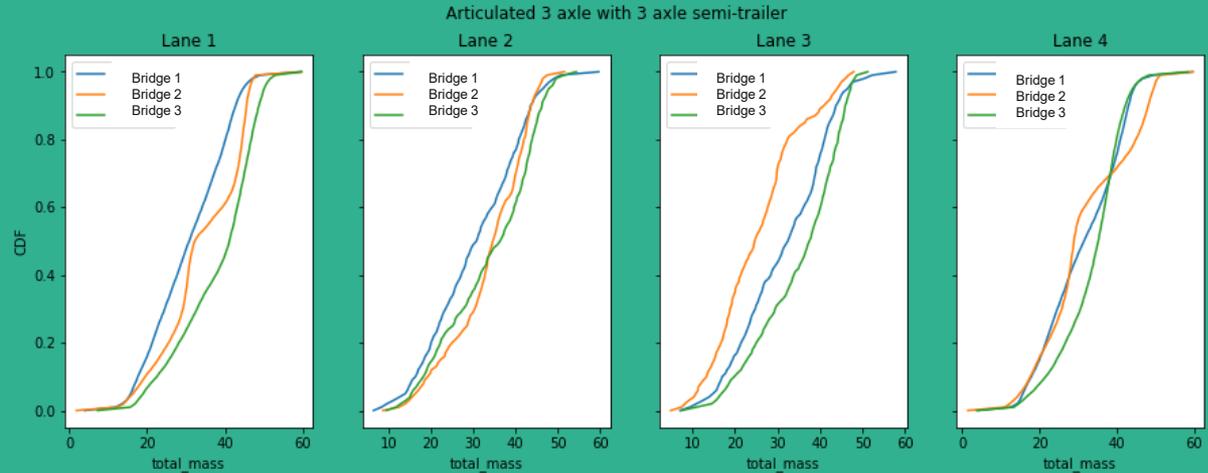
Cons:

- No weight data, only vehicle category.

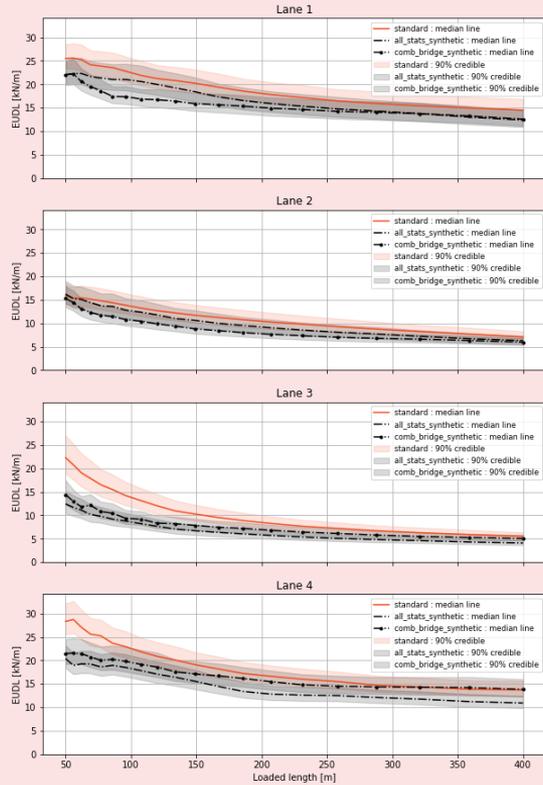


Missing weight data

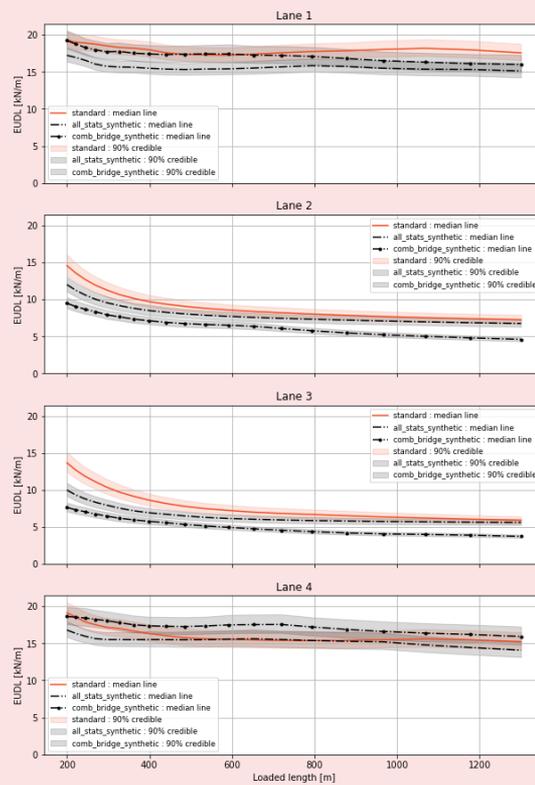
- Vehicle weight differences between locations
- COWI pilot study



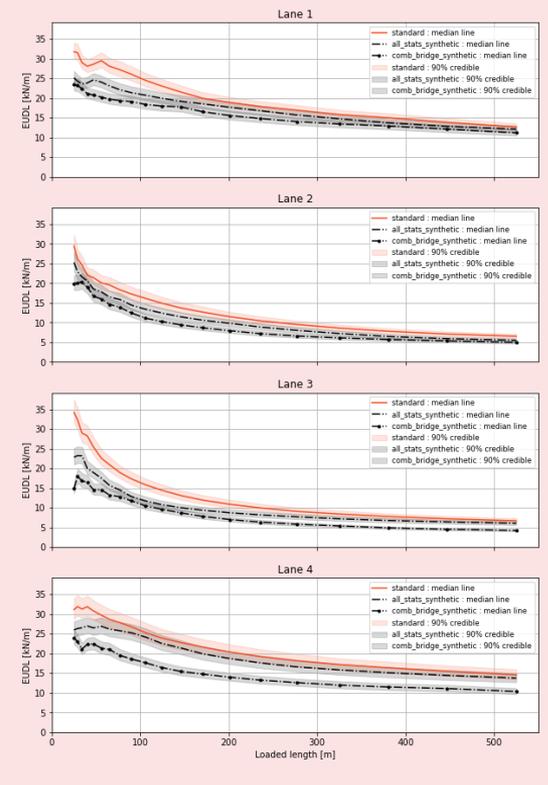
Bridge 1



Bridge 2

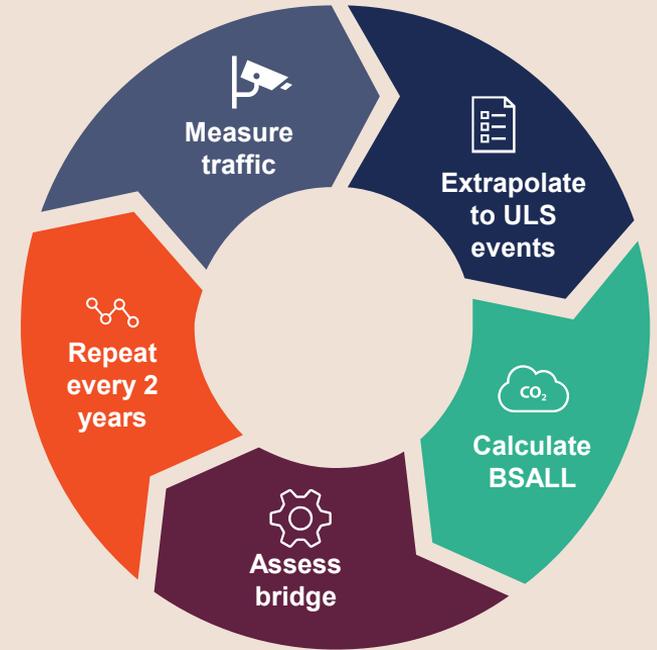


Bridge 3



Next steps & discussion

- WIM vehicle data and video footage for a set of assets from existing data or from a trial – interest in collaborating?
- Indication of asset portfolio?
 - Mix of spans within your portfolios? Exp. gain from ≥ 40 m
- Would you or your organisation find this of use?
- Where would you suggest we take this next?





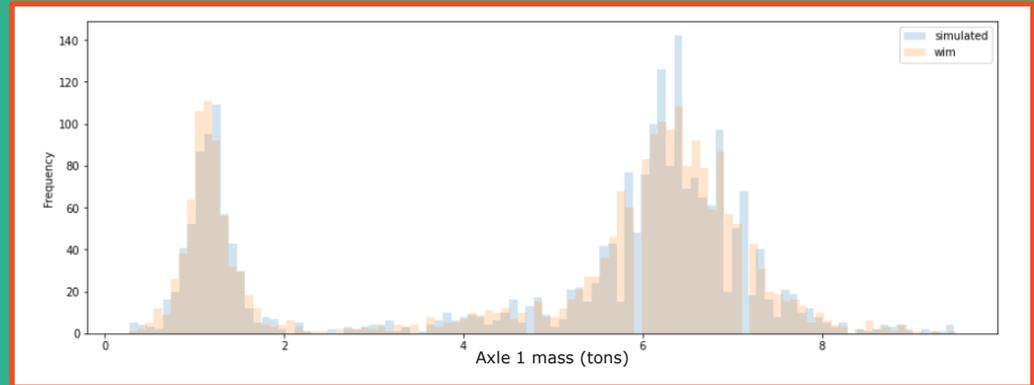
Thank you



Cameron Archer-Jones and Arfon Irish
(cnas@cowi.com & arir@cowi.com)

Missing weight data

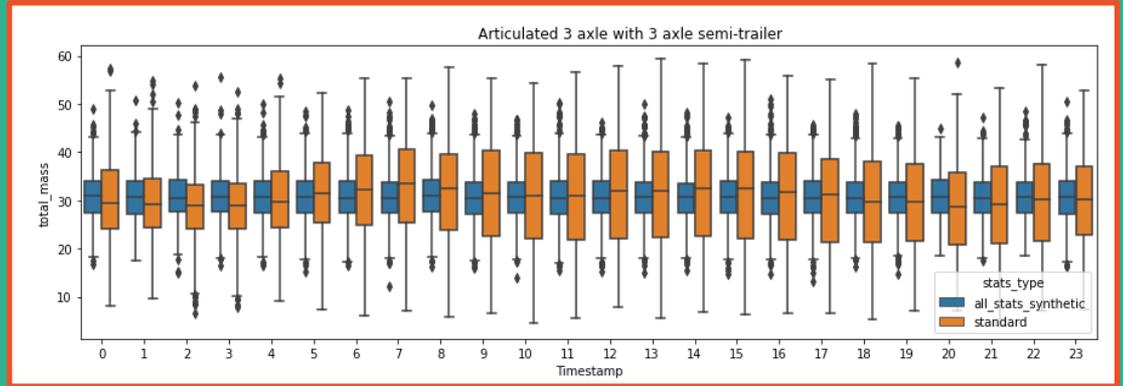
Comparison between weight distribution in WiM system data and simulated data



Traffic weight through day

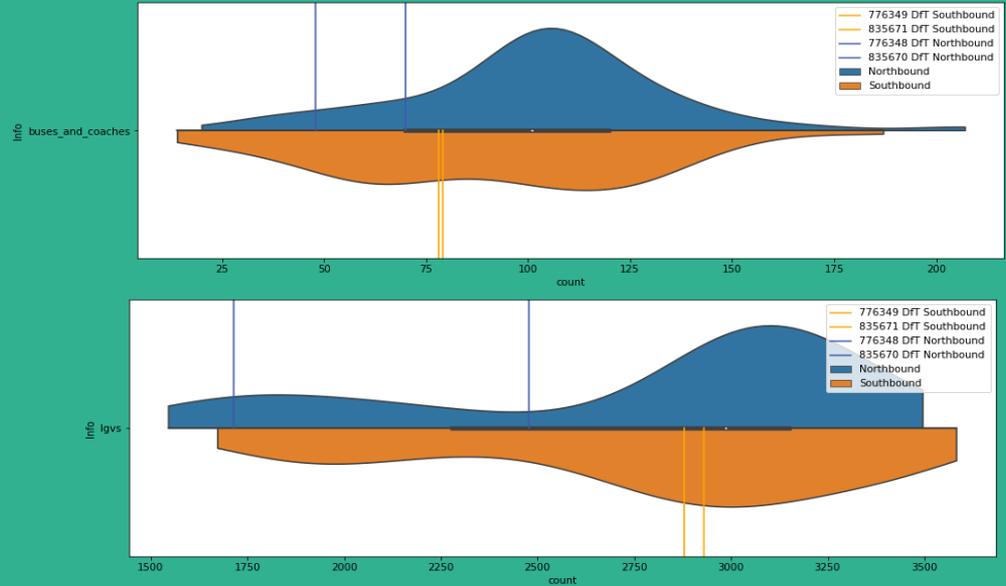
Our method does not currently allow for variation in vehicle weight by time of day.

This could easily be developed for further accuracy.



Daily traffic data

Not appropriate for a BSALL



Extrapolation process

Extrapolate to ULS traffic jam.
Still conservative and therefore
safe!

