

Enhancing Road Network Resilience Through Road Maintenance

Opportunities for Developing Countries

ADB Brown Bag Session

29th Feb 2024

Dr Ian Greenwood

BE(Civil), PhD(Eng), FEngNZ(Civil), CPEng(NZ)

ian@gaic.nz

The Problems We See

Unmaintainable assets

- Culvert so small that it blocks and can't easily be unblocked.
- Sometimes a saving isn't really a saving at all.





Source: Roadex.org

Maintainable but blocked culverts

Roadside higher than the road

- Lack of maintenance of the berm.



Improper Cross-fall with water ponding on the road

In-filling of side drains (uncontrolled road side development)





Lack of access control –
blocking side drains



Assets placed in waterways

Fast eroding soils with limited erosion control



Poorly Maintained Gravel Roads



<https://landshapersexcavation.com/>



Blocked drainage systems

The Consequence

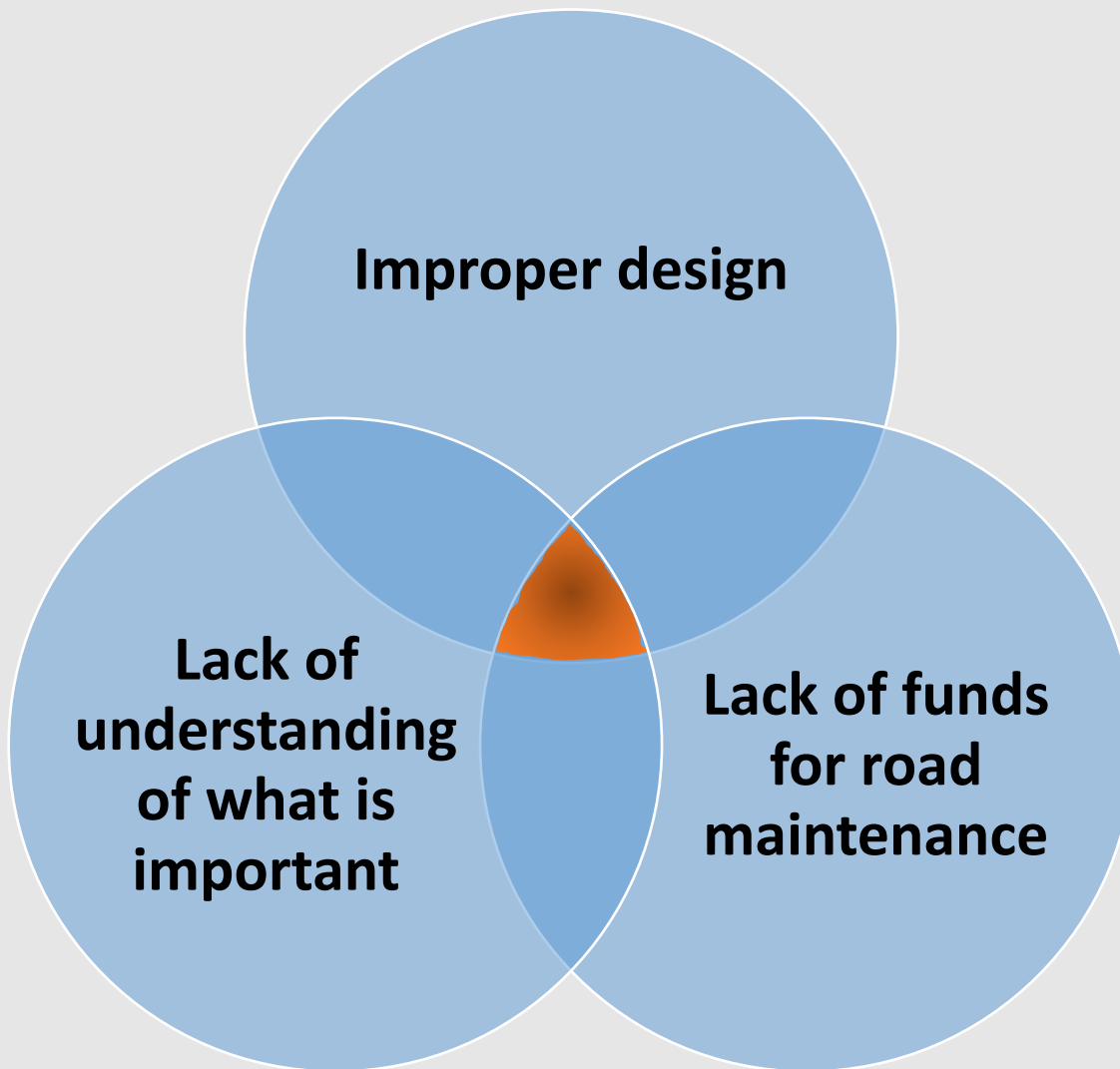
Where Many DMCs Are At

- Roads are not delivering the resilience they were design for.
- Even further from meeting the demands of climate change.
- High risk of asset failure with significant repair costs.
- Investment in building resiliency is lost.

The Causes

And some possible solutions

Recipe for a Low CR Outcome



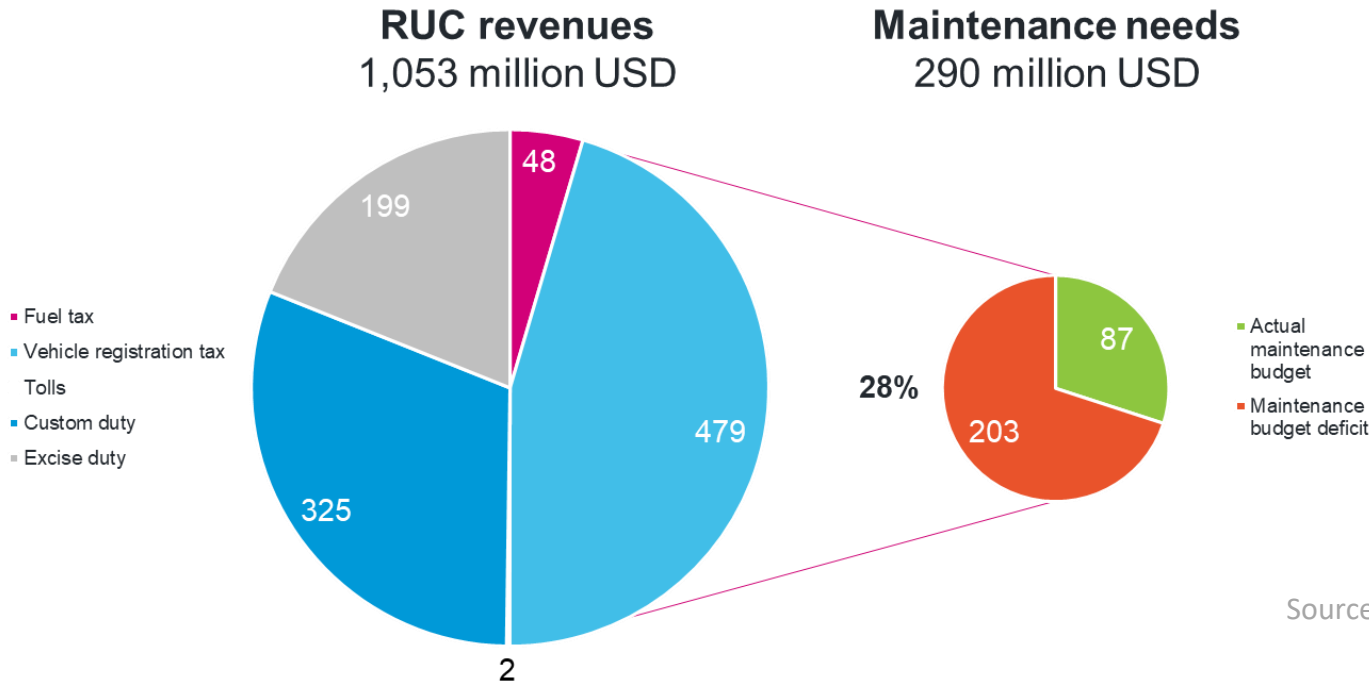
- This shouldn't happen, but it does (all over the world)

Questions to consider:

- When were design standards last updated?
- When were rainfall design charts last updated, and do they reflect the future climate?
- Ensure maintenance teams have an input to design standards.

Lack of Funds for Roads

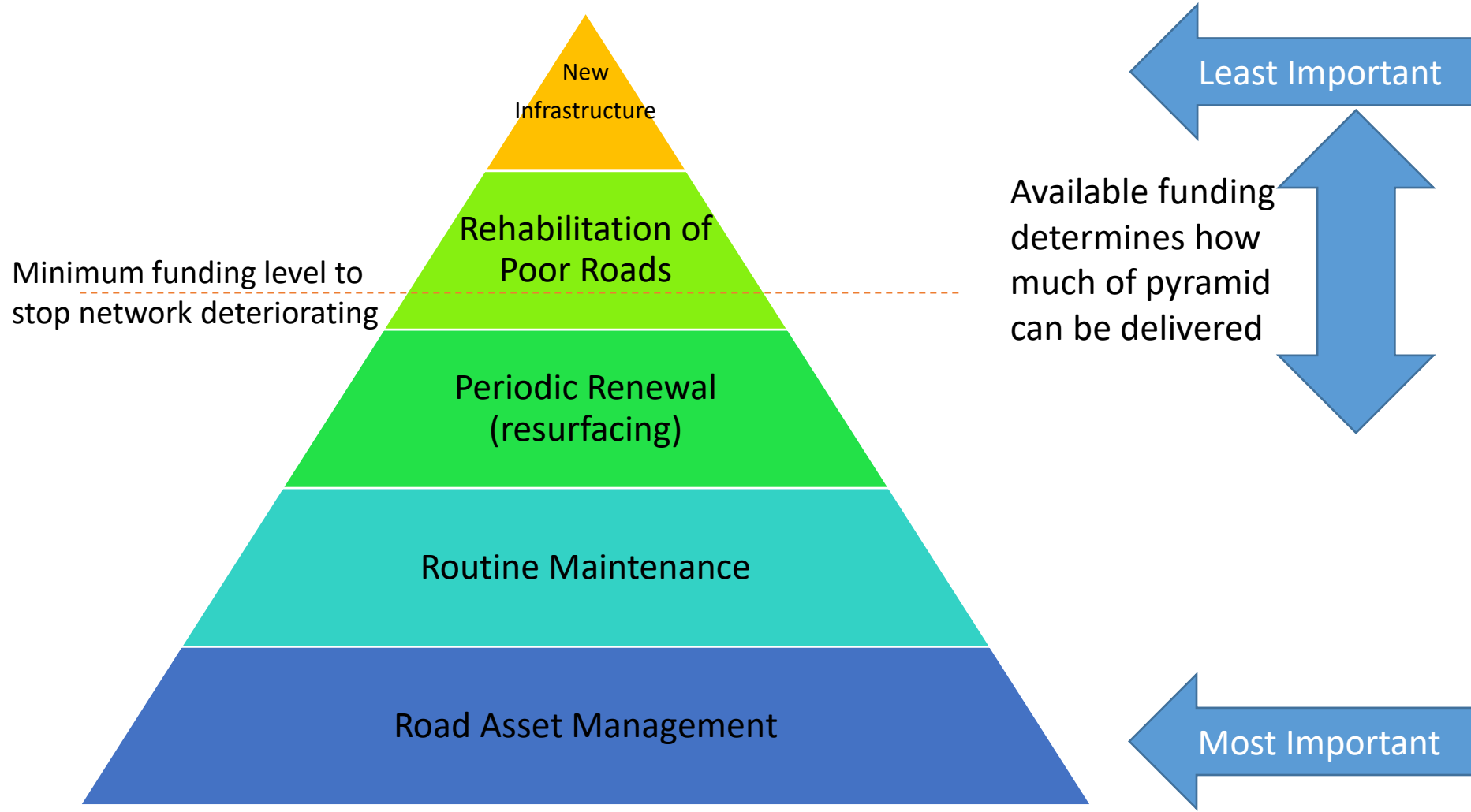
- Seldom an overall lack of funds for roads.
- Many developing countries use road income to subsidise the consolidated fund.



Lack of Priority to Maintenance

- Too much focus by DMCs and MDBs on building new infrastructure
 - **We cannot build our way to a CR future without due consideration of maintenance.**
- Road maintenance and RAM often seen as low priorities
 - Not consistently recognized as being the essential part of delivering a CR network
- Every 1km of new road built to be CR, is 50km of existing road that loses its CR if maintenance is not funded.

Road Network Needs To be Built on a Strong Base



Lack of Understanding

- Simple rule:
 - If it was worth installing at \$100, it is worth maintaining at \$2/yr!!!
- High priority activities in rain impacted areas:
 - Clean the drains
 - Ensure shoulders are correctly shaped to get water to the drains
 - Repair potholes before the rainy season
 - Ensure unpaved roads have a good cross-fall (no water running down the road)
 - Keep on top of resurfacing program
- What needs to be done before, during and after climatic events?
 - Capture that into the maintenance contracts (or in force account instructions)

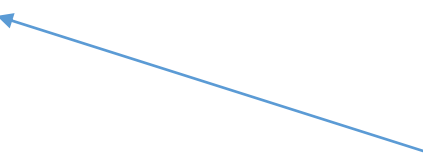
Stop Claiming Fictitious Benefits of Investments

- Projects are justified on the basis of the lifetime benefits.
- But, lifetime benefits are only realized if the routine maintenance occurs.
- The claimed benefits of any investment should be reduced to reflect the level of under-funding of maintenance
 - As a minimum model in tools like HDM-4 the actual maintenance practices that occur, not some idealistic maintenance regime.
 - If funding of maintenance is only 30% of need, then reduce benefits of project to 30% for all projects in that country
 - Would see many marginal projects dropped until sustained change in funding occurs, and reward those countries that are suitably investing in the maintenance of their assets.

Outsourcing

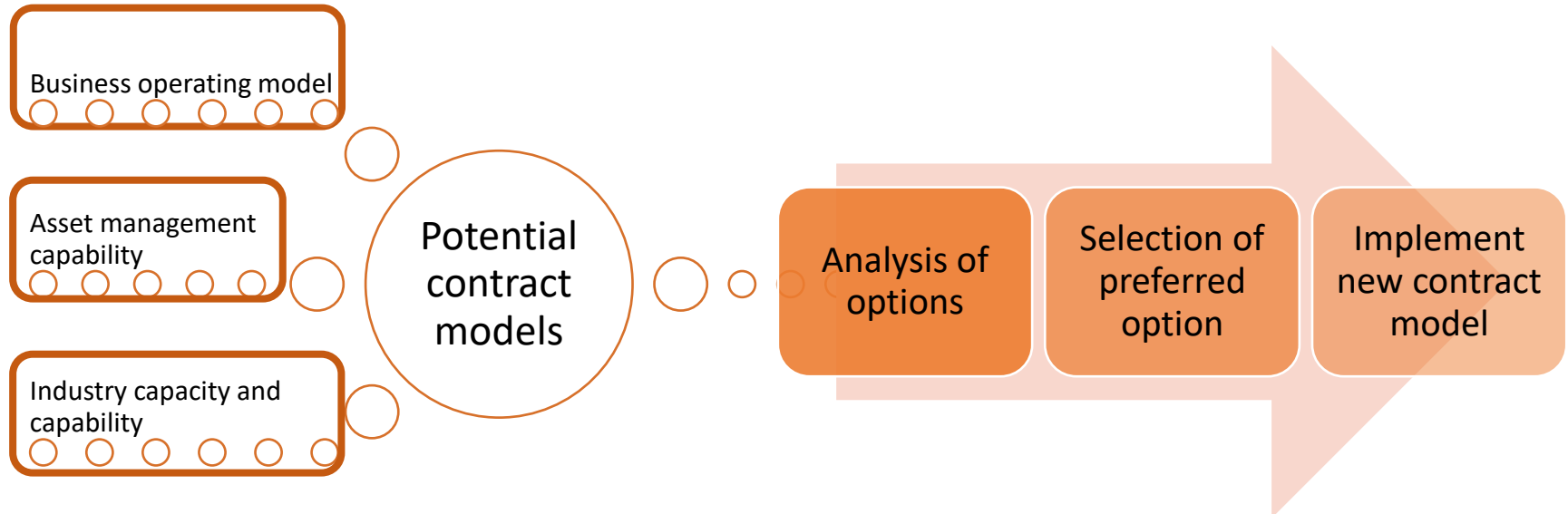
Outsourcing Maintenance

- Some asset management functions
- Emergency response (often missing in developing country contracts)
- Routine maintenance
- Periodic resurfacing
- Rehabilitation / Reconstruction
- [Improvement works]

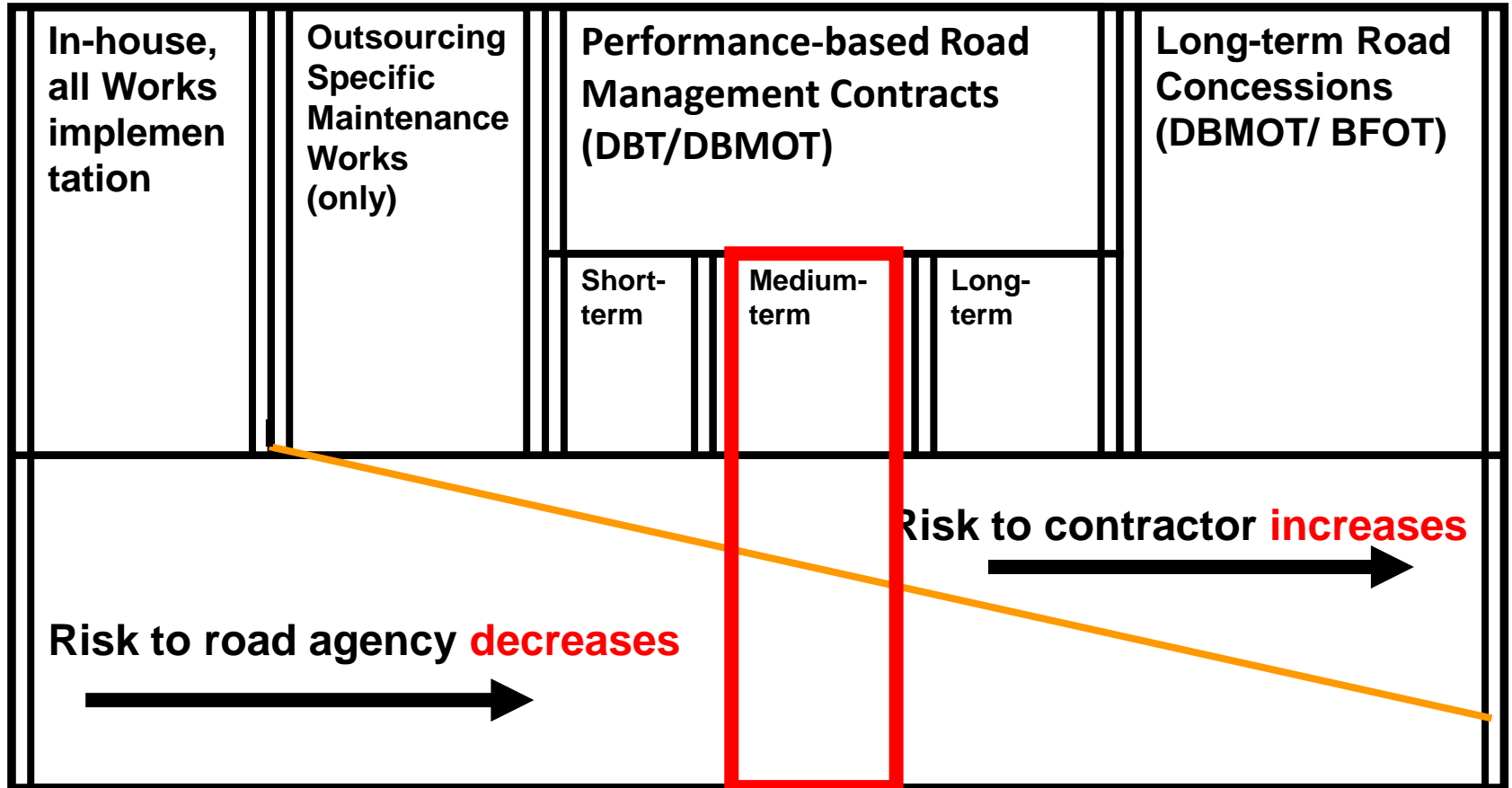


Typical DMC outsourced
“maintenance” contract has
80+% of costs in here

Process to Pick the Model



Risk Sharing



1. Routine maintenance is the #1 action to delivering a CR network.
2. We cannot build our way to a CR future without due consideration of maintenance.
3. For most countries it is not a lack of funds that is the issue, it is a lack of prioritization of those funds to where they would do the most good.
4. When evaluating the merits of an investment, due consideration should be given to the likelihood of the benefits being realized.

A blocked big culvert carries the same water as a blocked small one, it just costs more to construct.

Dr Ian Greenwood

Greenwood Associates Infrastructure Consultants

ian@gaic.nz

igreenwood.consultant@adb.org