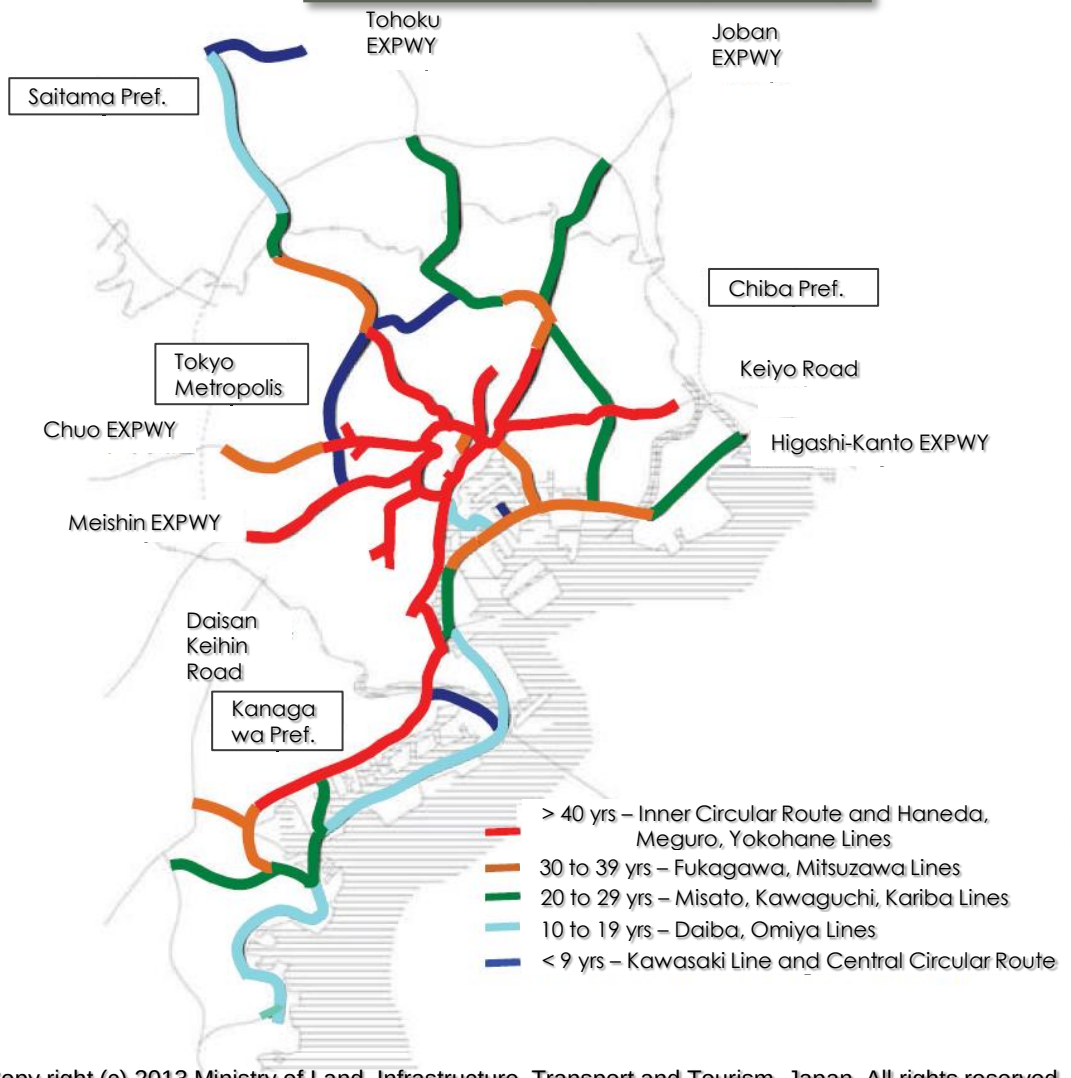
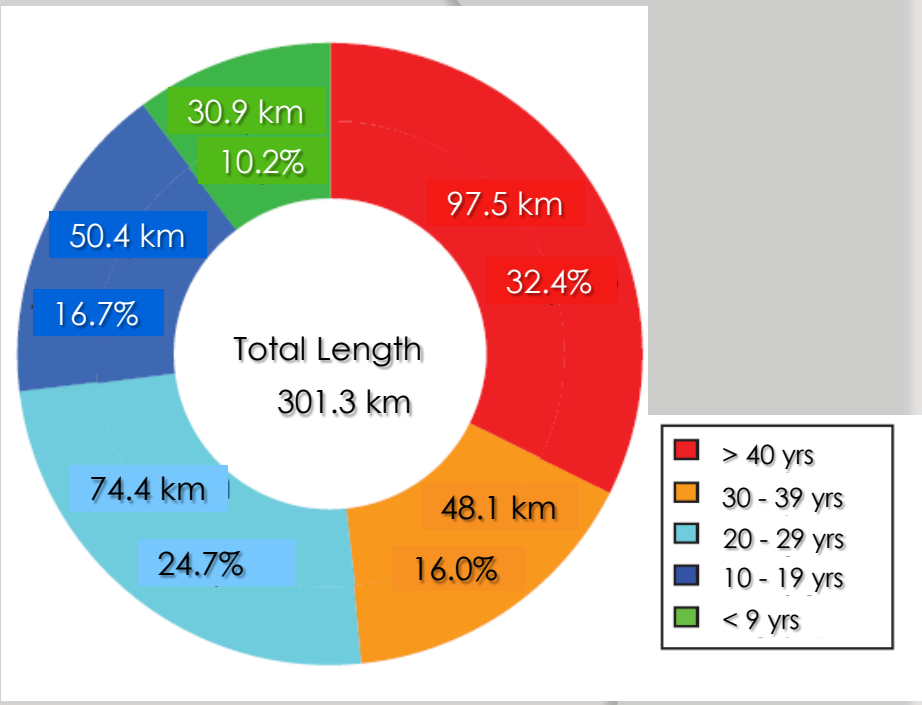
PRESENT STATE OF METROPOLITAN EXPRESSWAY (MEX) – 1/2

Structural aging is spreading, where ones' above 40 years occupies more than 30% (approx. 100 km in length) and above 30 years does nearly 50% (approx. 145 km) to the whole.

Years in Service (As of April 2012)

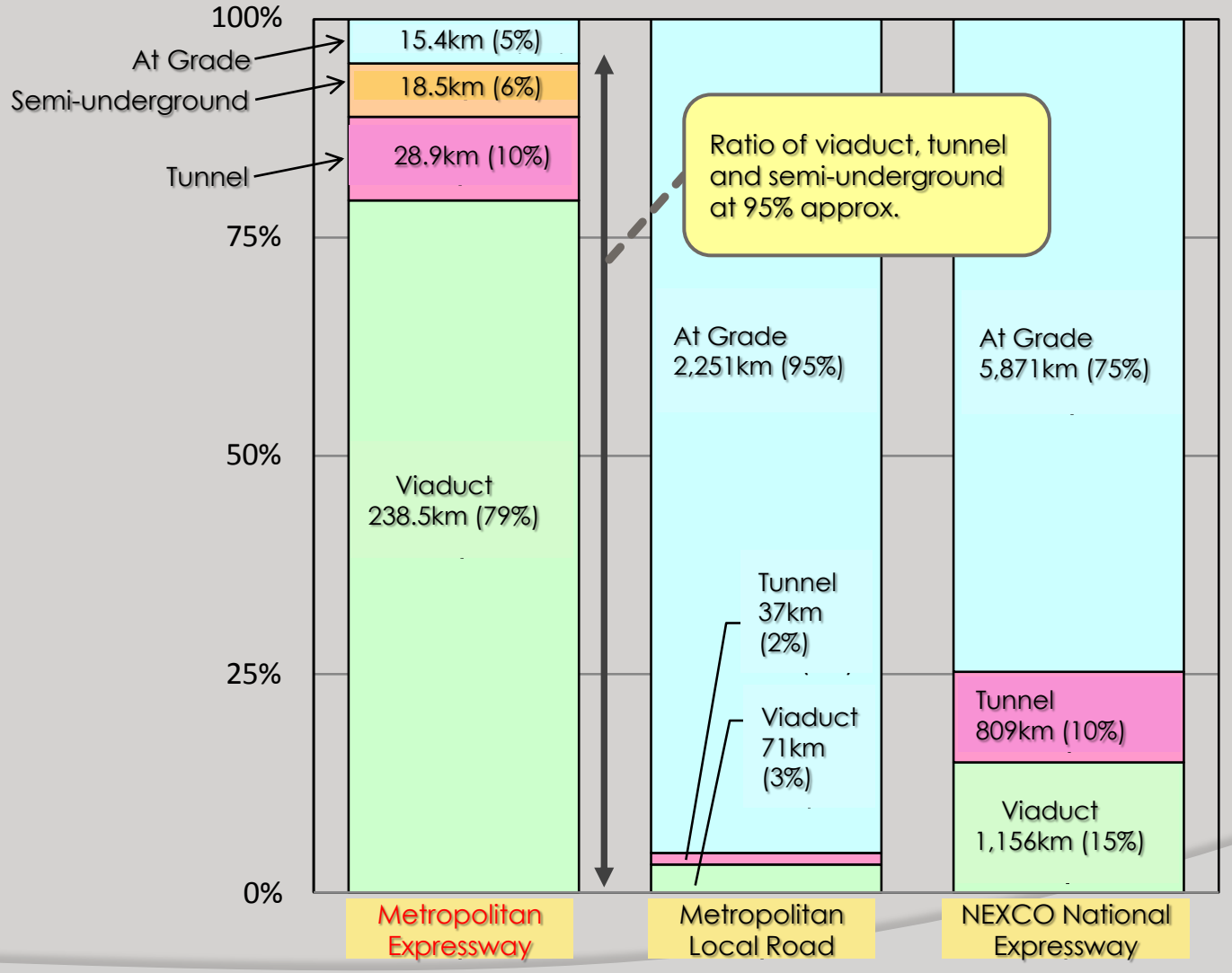




Years in Service and Ratios (As of April 2012)

PRESENT STATE OF MEX – 2/2

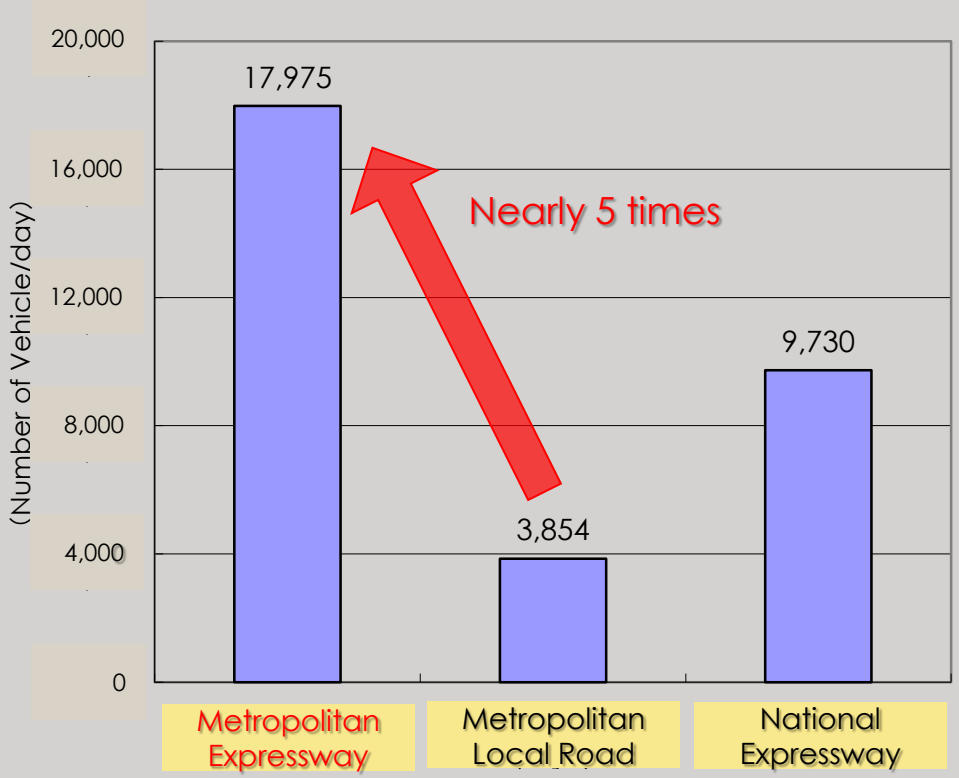
Structural type of viaducts, tunnels and semi-underground take up the majority with very high ratio at 95% to require much time and energy for maintenance.



Structural Type Ratio as of:
Metropolitan Expressway – Apr 2012
Metropolitan Local Road – Apr 2007
NEXCO National Expressway – Apr 2012

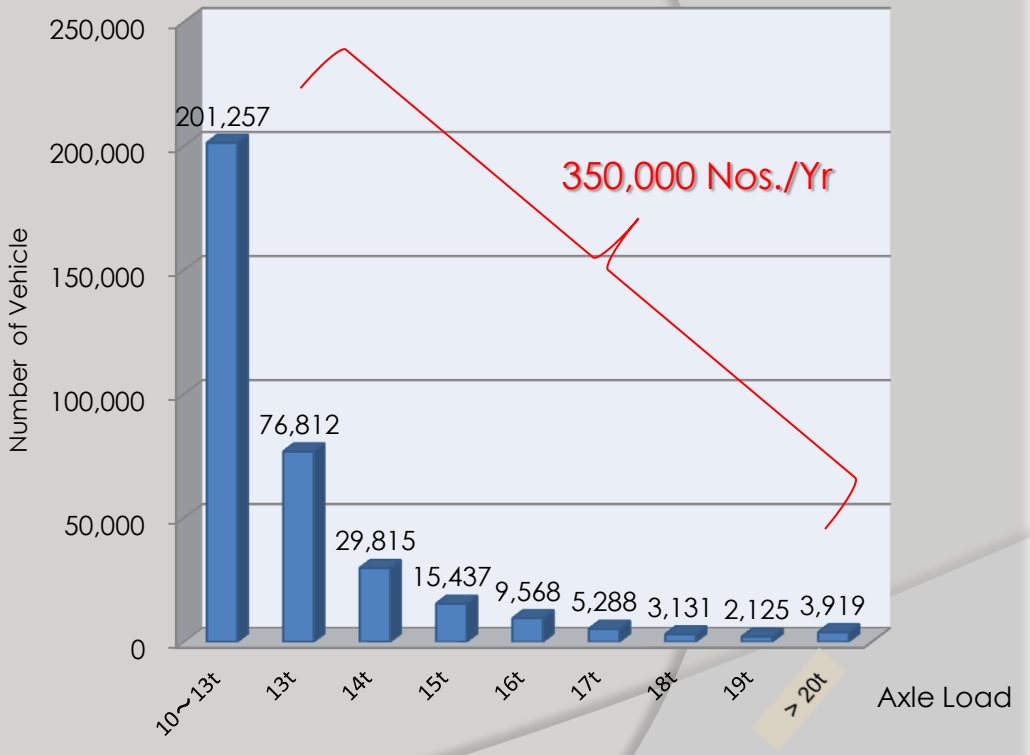
SEVERE USAGE OF MEX

- *In addition to high ratio of aged structure, heavy vehicles' usage counts 5 times of metropolitan local roads'.*
- *Annual traffic violation by over-loading counts approx. 350,000.*



Heavy Vehicles' Usage Comparison

Source: Road Traffic Census 2010



Over-loading Violation

Weighed at MEX toll booths in 2008

Structural Inspection and Repair at MEX

- *Check structural soundness by both daily and periodic (detailed) inspection*
- *Repair immediate for urgent damages and program routine for non-urgent ones*

INSPECTION

Daily

Patrol Inspection

Walk-around Inspection

Periodic

Close Inspection from Suspended Platform

Close Inspection from Lifted Platform

REPAIR

Paint

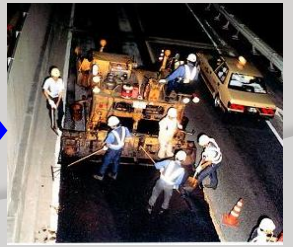
Deterioration

Re-paint

Pavement

Cracks

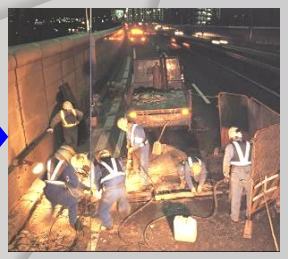
Re-pave



Expansion Joint

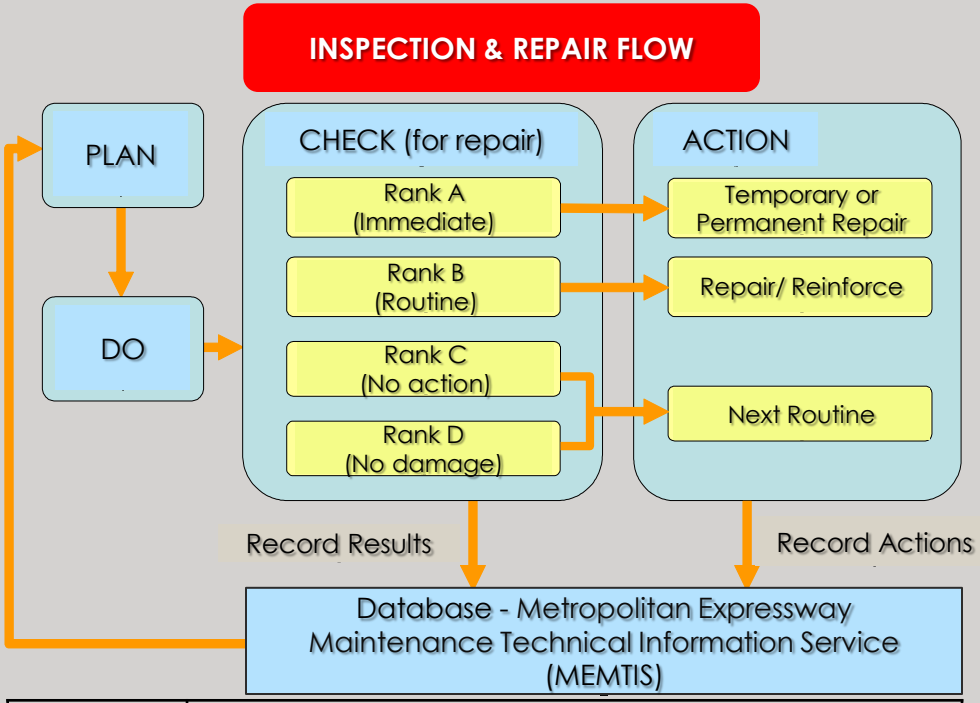
Broken

Re-install



Against Increasing Damages from Progressive Aging and Severe Usage

- *Exercise PDCA cycle for structural inspection and repair*
- *Implement damage assessment for ranking into A to D categories*
- *Carry out immediate repair on Rank A damages*
- *Do routine repair on increasing Rank B damages*



Rank A	Immediate repair needed to prevent damages to public etc.
Rank B	Programmed routine repair needed
Rank C	No need for repair but damages be recorded
Rank D	No damages but inspection be recorded

Examples of Repairs on Rank A (Immediate Repairs)

Flaking

Broken Joint

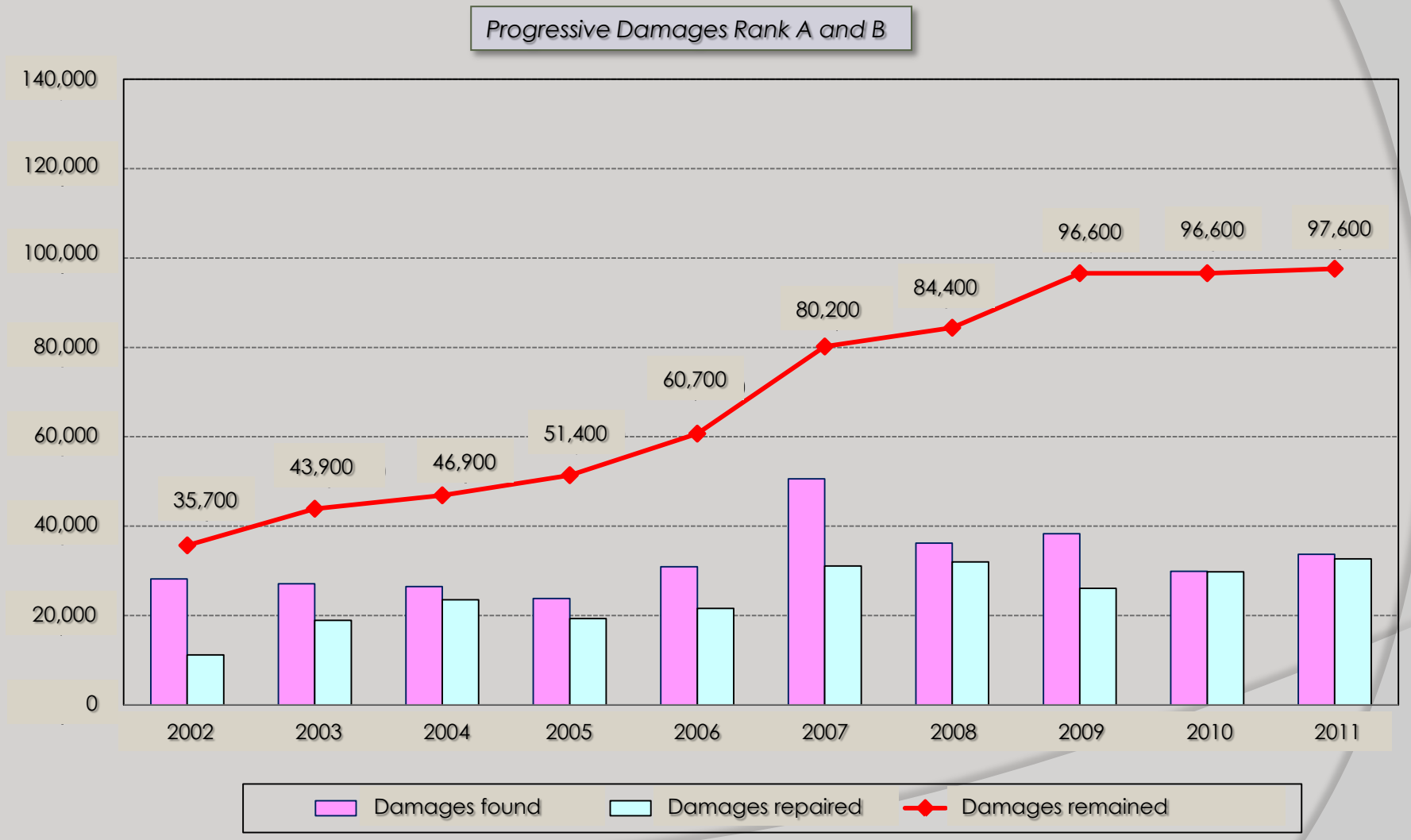
Examples of Repairs on Rank B (Routine Repairs)

Cracks on Slab

Corroded Bearing

Increasing Damages at MEX

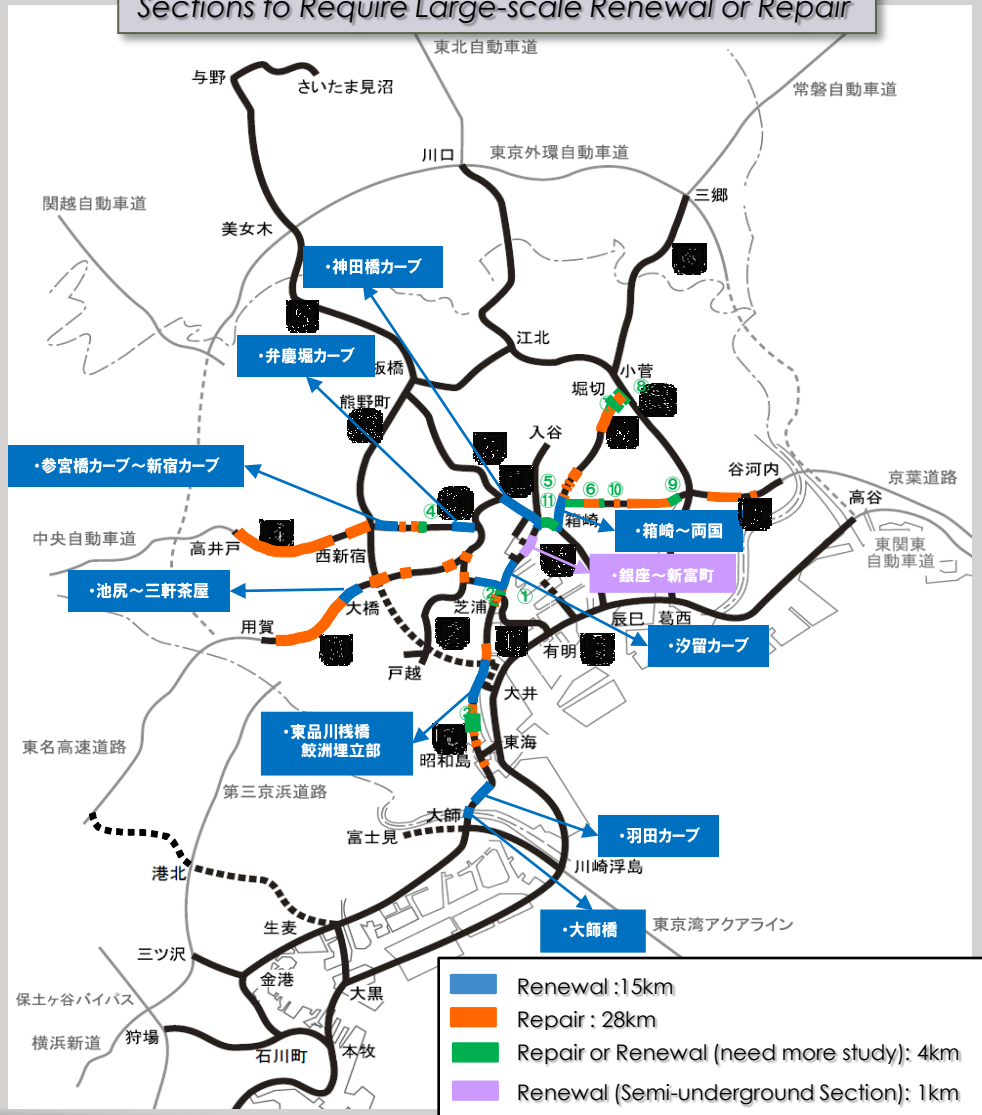
Due to progressive aging and long-term severe usage, cumulative damages (Rank A and B) counted nearly 100,000 at the end of FY2011.



MEX COMMITTEE FOR LARGE-SCALE RENEWAL

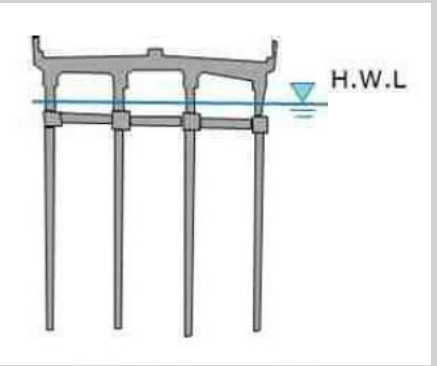
Cost estimate for large-scale renewal sums up 7.9 to 9.1 Billion US$.

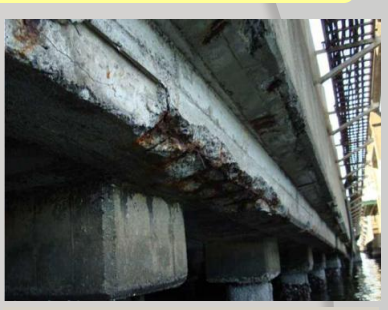
Sections to Require Large-scale Renewal or Repair



Examples of Section for Potential Renewal

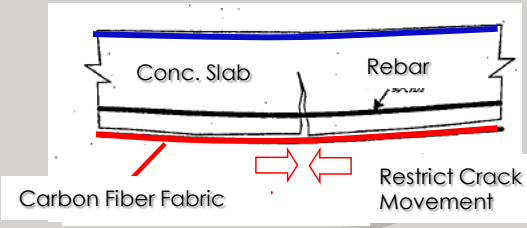
Route 1 Haneda Line – Higashi Shinagawa Viaduct (Marine Section)

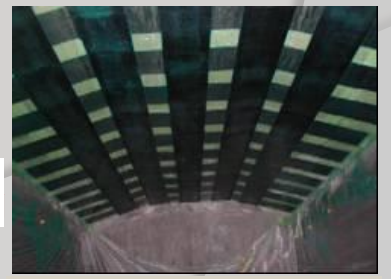




Flaking Caused by Rebar Corrosion

Examples of Section for Potential Repair





Reinforcement with Carbon Fiber Fabric (Before Coating)

ISSUES AT LARGE-SCALE REPAIRS/RENEWAL

- *Efforts for Implementation of Large-scale Repairs/Renewal*
  1. *Seek public understanding*
  2. *Corporate close between Central Government and local governments*
  3. *Develop technology and train specialists*
  4. *Reinforce daily inspection*
  5. *Examine when to implement large-scale renewal*
  6. *Minimize adverse effect to public due to large-scale renewal*
  7. *Facilitate harmonization with urban environment*

- *Efforts to Meet Public Demands*
  1. *Examine city planning to contribute to its reform*
  2. *Make urban environment attractive*
  3. *Reinforce urban function against disasters*

- *Efforts to Secure Budgets*

Source: Suggestions made by MEX COMMITTEE FOR LARGE-SCALE RENEWAL, 15 JAN 2013