

Future Development Needs In Asset Management – The World Bank’s Perspective

The World Bank is playing, and has historically played, an important role in development in the road asset management sector. We are involved in supporting our partner countries in most of the relevant activities normally captioned under asset management; from data collection; data analysis; maintenance delivery as well as the reforms needed to make it all work. The Bank’s engagement in the sector can among others been seen from our role in developing HDM, a cornerstone in many asset management systems (especially in the developing world) as well as in the successful adoption of performance based maintenance in many countries.

Data does not exist for asset management projects alone, but the World Bank’s transport lending portfolio is of about 7 Billion USD annually, of which about half is within the rural/interurban subsector, which is where the Bank’s asset management focus has normally been.

When supporting our partner countries the Bank strike to find the sustainable balance between processes, people, technologies, and funding, as our experience has shown that successful projects properly addresses all four factors. In addition to this approach, we are also as part of our dialogue with our partners putting the typical asset management technologies and tools into the greater framework of total asset management, where asset management embraces organizational visions and missions, customer expectations and legislative requirements.

It is hence clear that the World Bank is heavily engaged in asset management, and thus also has a keen interest in the development of the sector in general and in the development of asset management tools in particular. From the perspective of the World Bank, when looking at the tools supporting asset management we would characterize developed in two paths: (i) an “evolutionary” path where current approaches are done better and more advanced, and a (ii) “revolutionary” approach, where new tools and approaches are changing the what we based decision-making on.

The *evolutional* path will include the continued development of cost-effective data collection systems, which collect more, new and better data at higher quality, using less subjective input in data processing, and use this improved basis for better pavement modeling and calibration, all aiming at being better at modeling pavements and forecast development and deterioration. This would be supported by the continued development in analysis capacity of IT hardware.

On the same path we find **systems integration**. As road agencies develop their asset management capabilities and request new generations of systems to support them, the needs for fully integrated systems are increasing, as agencies are often responsible for not only pavements (and related inventories/furniture) but also for other assets such as bridges, drainage structures, geotechnical data, and routine maintenance (and management). Clients want integrated systems which reflect their needs for a balanced view of their assets, and properly prioritize between different sectors – not a specialized system addressing only one of its assets (though arguably a very important part).

Furthermore clients requests web-based and cloud-based systems, taking advantage of new developments in IT technologies, which most agency staff uses naturally at work as well as privately. GIS

interfaces are also expected to take a more prominent role in operating asset management systems as well as the use of mobile phones, where users and road administrators can readily access real time data or provide feedback – for instance complaints.

The game changing “revolutionary” path involves introduction of new features which makes the data collection, modeling and decision more advance and take into account features and issues not previously used in managing pavement assets. This will include greater focus on ITS, road safety, effects of climate change, and carbon footprints. Several of these new features are aligned with the global policy agenda, which asset management will need to reflect and support. As the world becomes more interconnected and social media more prevalent, the decision making will expand to a wider community away from just technical specialists.

Road safety. Reports show that 1.24 million people were killed on the world’s roads in 2010. Road accidents results in large economic and social costs for countries and families, and is rightfully receiving increasing attention in many countries. Future asset management will need to integrate road safety into its management models and systems. iRAP is an example on approaches which follows asset management compatible approaches in being proactive, but reactive models such a black spot analysis will also remain. In pavement management, this means that when programming or designing maintenance, road safety will have to become an integral part of the design, adding features which could support a proactive stance on road safety. This moves road maintenance from being focused on restoring pavements (and to cope with future utilization) to improve the maintained road sections in features beyond the pavement (for instance adding hard shoulders, introducing line-marking, adding safety barriers etc.). As many of the data needed for such analysis is a natural part of the asset management register, asset management has the opportunity to integrate proactively road safety into modelling and decision-making. Technologies will be developed with automatic recognition of issues which can feed into our asset management. We will be able to use the real-time data vehicles are not collecting as part of their vehicle management systems on issues such as surface friction and potentially roughness. Many road agencies already have programs for addressing road safety, but these are often parallel programs, and need to be integrated with the asset management systems.

Greenhouse Gasses and Air Pollution. An increasing number of countries are committing to reducing greenhouse gasses. In 2004 at a global level, the transport sector was responsible for 6.3 Gtons of CO₂ emissions (counting for about 12 percent of the total emissions) - of this road transport is responsible for 74 percent. Reductions in emissions from road transport thus have potentials to support global reductions, which mean that when the pressure on global reductions increases, road management will have to contribute for its part.

In line with this global trend, the World Bank has decided that for all transport projects the GHG footprint will need to be estimated and included in the decision-making during project preparation. Simplified models to support this have been developed.

Future models should be able to not only calculate the CO₂ emissions, but also help develop and management the network to minimize the emissions, so the decision-makers can be provided with cost-

effective measures to reductions. This will include modelling of new pavement types, which support reductions in emission, through reductions in energy/fuel consumption (for instance the COOEE study).

Emission modelling is thus expected to become more important for future road management decision-making, and should help us answering or analyze questions such as: (i) what is the GHG and air pollution footprint of my network; (ii) how can road management assist in reducing emissions; and (iii) how many people is affected by air pollution.

ITS. The increased use of ITS in order to support road transport management also provides opportunities for improved road network management. Traffic can be diverted to where capacity is available, leading to a more balanced use of the network, eventually reducing the needs for road widening, but ITS can also be used to guide the heavy portions of the traffic to roads which are better equipped and designed to cope with the heavy loads, reducing network pavement strengthening needs on other weaker road sections. When looking at investing in pavement and capacity improvements the benefits of ITS implementation need to be considered since there may be wider benefits from ITS integration.

Climate Adaptation. Road agencies in many countries are already feeling the effects of climate changes, from more rapid pavement deterioration, effects of blue-spots, and transport diversion due to road closures (sometimes to roads not build to this traffic). In order to better prepare for the increasing effects of climate changes, pavement models and asset management systems needs to be enhanced to include current and future risks and effects. Models are needed to help answer or analyze questions such as: (i) what is the cost of future climate changes to my current network; (iii) where are the climate change sensitive sections in my network; and (iii) how could I develop my network over time to make it more robust to climate changes (and to what costs).

Optimization of Materials. In many countries there are shortages of aggregates. It is essential to integrate into the modelling process improved application of recycling technologies, reflecting the major benefits that arise from optimizing limited materials.

Integration with Design Processes. There has always been a disconnect between the treatments generated by a PMS and those that arise through the detailed design once a section to be treated is identified. As we move to better data collection this disconnect will decrease, resulting in closer integration between these processes. The recent work in South Africa provides a road map for how this can be done.

Better Decision-modelling. As more and more road network issues are modelled (ITS, climate changes, greenhouse gasses/air pollution), it will be necessary to develop new decision-models which move away from the enumeration or heuristic (efficiency frontier) approaches, which were developed at times where computer analysis power was much less than available today. It is foreseen that more complex models will be developed, which can better reflect the more complicated and complex decision-making structures in today's worlds, where different considerations will need to be factored into the decision modelling (probably moving away from single objective analysis (e.g. optimize NPV under budget constraint), to multi-level objectives). The multi-dimensional analysis approaches will result in a more

scenario-based output in which decisions can be taken, rather than the current “one single optimum (economic) solution” to the problem.