Recent Trends in Road Asset Management and Case Studies

WORKSHOP PROCEEDINGS

ASIAN DEVELOPMENT BANK
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Executive Summary

Road Asset Management (RAM) has long been an important area of intervention for Asian Development Bank (ADB) assistance to its developing member countries (DMCs). This reflects the demands of DMCs for rational, transparent, and sustainable use of road assets, which ADB aims to support through technical assistance (TA) and grant and loan projects extended to road agencies of DMCs.

At the 2013 retreat of the ADB Transport Community of Practice (TCoP), staff indicated the need for a bank-wide knowledge product that captures best practices in RAM in DMCs. Towards this end, the Advisory Team for Governance and Institutional Issues is working with the Advisory Team for Roads to lead the task of developing the bank-wide knowledge product titled Improving Road Asset Management in Asia and the Pacific (iRAM).

As part of the overall iRAM initiative, it was determined that a workshop to align understanding of RAM within the TCoP was required. The workshop, held on 25-26 November 2013 at the ADB Headquarters in Manila, was conceptualized not as a “how to” for RAM, but rather to identify the recent development in RAM, identify successes and failures and learn from a number of case studies around the world. Workshop presenters include individuals from ADB, the World Bank, the Department of Public Works and Highways (The Philippines), and established academic institutions.

The workshop contained seven main sessions, as follows:

- Session 1: Recent Development in RAM – Overview & Technology
- Session 2: Recent Development in RAM – Institutional Enhancements
- Session 3: Recent Trends in RAM for World Bank Financed Projects
- Session 4: Case Study – Cyprus and Malaysia
- Session 5: Case Study – The Philippines
- Session 6: Case Study – New Zealand
- Session 7: Panel Discussion

While each session had its own key discussion points (covered later in this summary of proceedings) a number of points were common across the sessions and are worth drawing attention to. These are:

1. Leadership from those at the top of the organization is essential if RAM is to succeed. RAM, like safety, requires a cultural focus to implement and with the implementation timeline typically beyond 5 years before RAM can be considered sustainable in an organization, it is only through strong leadership that success can be achieved.

2. RAM is a holistic approach to managing road infrastructure and is not simply about data collection, a new information technology (IT) system or a different form of contracting out physical works. If RAM is to be successful (and sustainable from a business model) then it is essential that all elements of RAM are given due consideration and support;
3. Embedding RAM into an organization is a multi-year initiative. In developed
countries with a long history of data collection and use of systems, it still takes
several years to make the step change from maintenance management to full asset
management. These countries also only implemented sophisticated IT systems
once the basis was understood and well-practiced. By comparison, in donor
funded projects there is a tendency to try and achieve a much higher level of
sophistication in a much shorter time frame (3-5 years) than can reasonably be
expected;

4. IT systems (especially decision support tools such as HDM-4) should be kept to the
simplest form, as the data and human resources needed to support such tools can
be a significant distraction from making real progress in RAM. Additionally, if the
business processes are developed around these tools and the staff members
responsible move to another role, then there is often no sustainable business model
to replenish the skill sets needed;

5. Outsourcing physical works via some form of performance based maintenance
contract (e.g., Output and Performance-based Road Contract (OPRC)) is not a
means of avoiding the need to establish sound RAM capabilities and understanding
within the road authority;

6. While RAM can help make better use of the funds available, where there is a
significant shortage of funding this must be addressed if RAM is to make any real
difference;

7. A more inclusive approach should be considered by development partners in future
interventions with the intention of ensuring that RAM is a key part of projects and
not an ‘add-on’ function.

The key findings and conclusions from the workshop and actions moving forward are:

1. RAM needs to be considered an integral part of project arrangements, and not just
an add-on to capital improvement projects. To achieve this, additional RAM
capability to support projects in the development phase will likely be required;

2. A RAM maturity assessment that is applicable to those authorities just commencing
RAM is required;

3. A long-term (5-10 year) plan is required for the establishment of a sustainable RAM
program within a road authority (based on the findings of the maturity assessment);
and

4. IT systems and associated data collection should be kept to a minimum level to
increase the chances of attaining a sustainable RAM outcome.

The post-workshop survey of participants indicated a high level of satisfaction with the
workshop, with 100% of respondents rating the workshop as either Satisfactory or Very
Satisfactory across the categories of Content, Relevance, Duration, Use and Quality of
Materials. Furthermore 100% of respondents answered ‘Completely’ or ‘Almost
Completely’ to the question on whether the program gives you the knowledge, skills and
attitudes needed in the course of their work.
1 Background to the RAM Workshop

Road Asset Management (RAM) has long been an important area of intervention for Asian Development Bank (ADB) assistance to its developing member countries (DMCs). This reflects the demands of DMCs for rational, transparent, and sustainable use of road assets, which ADB aims to support through technical assistance (TA) and grant and loan projects extended to road agencies of DMCs.

At the 2013 retreat of the ADB Transport Community of Practice (TCoP), staff indicated the need for a bank-wide knowledge product that captures best practices in RAM in DMCs. Towards this end, the Advisory Team for Governance and Institutional Issues is working with the Advisory Team for Roads to develop the bank-wide knowledge product, entitled “Improving Road Asset Management in Asia and the Pacific (iRAM)”. This knowledge product aims to recommend appropriate models of future ADB interventions on RAM, and establish TCoP’s position on specific topics such as institutional setup, capacity requirements, business process etc.

The recommendations and findings will be integrated into ADB’s future project design to enhance the sustainability of road infrastructure in ADB’s DMCs.

As part of the overall iRAM initiative, it was determined that a workshop to align understanding of RAM within the TCoP was required. The workshop, held on 25-26 November 2013 at the ADB Headquarters in Manila, was conceptualized not as a “how to” for RAM, but rather to identify the recent development in RAM, identify successes and failures and learn from a number of case studies around the world. Workshop presenters included individuals from ADB, the World Bank, the Department of Public Works and Highways (the Philippines), and academic institutions.

This document captures the summary of the workshop, drawing out the key messages from each session, and includes a short synopsis of the case studies discussed.
2   Workshop Summary

2.1   Welcome and Introduction

In his welcome remarks, Gil-Hong Kim, Director, Sustainable Infrastructure Division (RSID), Regional and Sustainable Development Department (RSDD), emphasized the importance of road asset management in ADB’s transport sector operations, and the need to build the capacities of ADB staff by bringing in top researchers and practitioners to exchange best practices in the field of RAM. He also acknowledged that ADB has not taken a strong lead in this area in the past despite the huge demand from DMCs due to several factors, such as political issues, DMC and private sector capacity issues, as well as the low priority that ADB has previously given to road maintenance work.

Mr. Kim also underscored that the case for effective road asset management is clear, as poor road conditions in DMCs cause difficulty in accessing remote areas, equating to lost time, income and opportunity for the poor. This casts a large shadow on the efficiency of ADB’s road infrastructure investments. He stressed that ADB has since placed a higher priority on RAM, in keeping with the increase in infrastructure developments in DMCs. This puts ADB in a better position to do more in this area sooner rather than later, as trends indicate that the costs for road maintenance are expected to double by 2020.

And while there have been significant progress in RAM in the last few years, there is still a lot of room for improvement. From an ADB operations perspective, Mr. Kim highlighted that there are a lot of opportunities to work with DMCs on RAM, especially in terms of developing the capacity of DMC road agencies and the private sector in road maintenance planning, management and execution. He also added that RAM is not simply a technical issue, but also a matter of good governance and financing practices. He emphasized the need to have a dialogue with the different government transportation agencies in DMCs to raise the importance of RAM in the interest of better investment prioritization.
### 2.2 Session 1: Introduction and Technology

Session 1 combined both an overview of RAM (to ensure an alignment of understanding of the concepts) and specific presentations on the use of technology within RAM.

The key messages emanating from Dr. Ian Greenwood in the session are as follows:

- Asset management involves a more holistic approach to road management than that which is often practiced (maintenance management), and to be successful all elements of RAM must be given due support and consideration;
- Many agencies still operate as Facility Managers (FM), not Asset Managers (AM). FMs find the faults and fix as many as we can with the budget available, while AMs debate and agree on the service level and then deliver it for the least possible cost [whole of life costs];
- RAM is based on delivering the appropriate level of service and the lowest whole-of-life costs;
- RAM uses processes and procedures (such as that of the International Infrastructure Management Manual (IIMM) to ensure all aspects of RAM are coordinated;

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![Ian Greenwood presenting an introduction to RAM](image)

*Figure 1: IIMM AM Process*

• IT solutions are a support tool and not the centerpiece of RAM. When focus is given on the IT aspects of RAM, then it has a low chance of long term sustainable success;
• International experience has shown that RAM is most successful when at least two of the following four points are present:
  i. Champion – internal drive to do the right thing
  ii. Crisis – Infrastructure or service failure
  iii. Compulsion – Legislation / Policy / Audit
  iv. Funding – Access to funds dependent on having AM
• There is an increasing involvement of the public in the reporting of defects on the road (such as through the use of smartphones) and in turn the public expect action to occur;
• Need to recognize that some two-thirds of the costs incurred on a road are those of the road user (safety, vehicle operating costs, travel time) and that road authority costs (both construction and life-time maintenance costs) make up the other third;
• Decision support tools often become very complex and fail not long after the projects to install those ends. Need to ensure that the tools are no more complex than is absolutely necessary. Figure 2 illustrates the spectrum of increasing complexity with systems;

![Diagram showing different stages of decision support systems](#)

**Figure 2: Information and Decision Support Systems**  
*Source: Dr. Michael Burrow*

• Data is both costly to collect and manage, and therefore there is a need for a sound data management plan. With multi-function vehicles, the cost of collecting automated data is not dissimilar to that of traditional manual methods, although the coverage (100%) is much higher than traditionally achieved and with better repeatability;
• There is a need for both Performance Management and Level of Service measures to ensure funds are appropriately invested and that suitable demonstration of achievements can occur.
Questions were asked as to whether RAM was “something fancy” and whether it was appropriate for a developing country. The response was that RAM exists as a spectrum of complexities and that focusing on the core RAM functions (as defined in the IIMM) were appropriate to an authority just commencing RAM. It was also reiterated that there are many “easy hits” within the core functions and that by focusing on the more advanced aspects many road authorities miss what are often quite simple and significant improvements.

There was also discussion around the usefulness of customer surveys. While these are very worthwhile, there was a need to consider aspects of whether the time series were valid and how expectations shift over time. It is also necessary to be able to demonstrate the impact of political decisions within RAM.

### 2.3 Session 2: Institutional Enhancements

Session 2 was focused on the institutional elements of RAM, including elements of road sector reform, asset management planning & teams, the forthcoming International Standard Organization (ISO) standard on AM, and the use of AM maturity assessments.

The key messages emanating from Dr. Theuns Henning in the session were as follows:

- Roads are ‘big business,’ however there is a large body of evidence of poor performance of the road sector in many countries as evidenced by the condition of the assets, the financial costs and the institutional arrangements.
- The problems cover both process related aspects (funding, poorly performing public and private sectors, information management, policy, legislation and public consultation) and outcome related (poor road condition, high transport costs, high accident rates, environmental impacts and high levels of motorization growth). These problems lead to a need to reform the road sector in many countries.
- Financing Issues:
  - Road networks are growing faster than GDP in many countries, meaning that traditional funding mechanisms are not sustainable;
  - For every 1 km of new roads built, 3km are lost due to unfunded road maintenance; and
  - There is a need to start with the financial plan to ascertain what is affordable.

- Road Management Systems:
  - It is important to implement simple, appropriate and sustainable road management information systems
  - Regular visual inspection and monitoring system to raise awareness of maintenance needs is an absolute minimum
  - The purpose of Road Management Systems is to support the business processes of road agencies
- They should be capable of preparing medium and long term programs with analysis of funding scenarios
- Improved costing and accounting systems are needed to provide basis for financial planning
- Annual reports of road network performance (via an Asset Management Plan) is required, informed by regular technical and financial audits.
- Problems with systems include excessive dependency on data and inability to process data, too much expenditure vs. benefits, over-complicated systems and loss of flexibility

- **Asset Management Plans (AMPs):**
  - AMPs are standard corporate documents for well performing road authorities
  - AMPs bring together a summary of past achievements, along with future challenges and funding requirements.

- **Asset Management Team:**
  - RAM requires a strong team to support it, with members of the team being drawn from various parts of the organization, as depicted in Figure 3.

![Asset Management Team Diagram](image)

*Figure 3: Corporate structure for an Asset Management Team*
*Source: Dr. Theuns Henning*

- **Performance Based Maintenance Contracts** (e.g., Output- and Performance-based Road Contracts):
  - Good AM should be the primary goal of any contract model. Even where a Performance Based Maintenance Contract (PBMC) may not eventuate within a road authority, if the process of preparing for a PBMC has left a legacy of improved RAM then the project can be considered successful.
  - PBMCs can drive the paradigm shift in all parties necessary to deliver good AM outcomes. Many aspects of RAM such as defining service levels, understanding risks or defining a
sustainable funding level, are left unresolved or in the “too hard” basket under normal business conditions. PBMCs can help to bring these issues to a conclusion.

- Careful management of the full PBMC implementation chain (from initial support of the concept through to implementation of the contract) is necessary if a project is to be successful.
- PBMCs cannot succeed in the absence of good AM practice. They are not the silver bullet that lets a road authority avoid the hard yards and should not be seen as a way of avoiding addressing weaknesses within the road authority.
- There are advantages and disadvantages to PBMCs, and PBMC is not the solution for every scenario. This is why it is important to set the primary goal as being about improving RAM.

- **AM Standards and Industry Bodies:**
  - AM is a credible industry with professional bodies aligned to it. RAM is no longer just a practitioner's field, with qualifications on offer. While RAM has always been a leader in asset management in general, the road industry has been relatively slow to transition to the formalities of the standards available.
  - There are international guidelines and standards available, with the more common being:
    - The International Infrastructure Management Manual (IIMM);
    - PAS55, developed in the United Kingdom and used as the basis for the development of the ISO55000 standard. It is likely to be phased out in the coming years now that the ISO standard is available; and
    - ISO55000, which has been released in January 2014 and provides an opportunity to provide a formal structure around RAM.

- **Maturity assessments:**
  - Maturity assessments measure how advanced a road authority is across the many aspects of RAM. They provide insight as to where a road authority is weak and allow for a focused business improvement plan to be developed. As an authority becomes more mature, it is able to move the investment from highly reactive (fix what is broken) approach to a more considered life-cycle management approach as illustrated in Figure 4.
  - While there are several maturity assessments available, these have typically focused on refining AM practices within relatively advanced infrastructure organizations. For those road authorities just commencing with RAM, these international assessments may well be overly complex and a simpler assessment tool could well be justified for use across all donor agencies.
A question was raised around the ability to build capacity of the private sector to enable the reforms to occur. Tonga was used as an example where it has taken three years to go from a position of no credible road maintenance contractors, to now having multiple national bidders for work who deliver routine maintenance and periodic resurfacing works. The important aspect is to help the industry develop in a staged manner, for which one single step change from force account to outsourced PBMC is not appropriate. There needs to be consideration for providing a contractual means for industry to first learn “how to do” something; then progress to “how to do that something efficiently”; before moving to a model where the industry is also carrying the risk of “how many of those somethings will there be to do.”

It was discussed how funding rules can distort good AM from occurring. Examples were given from both the developed and developing world where funding rules resulted in less than optimal management decisions being made.

On PBMCs, there was a question over the ideal duration of the contract period. In many cases PBMCs have been implemented to effectively provide an extended warranty period of 2-5 years, rather than to have a contractor act as a partner in RAM. PBMCs have been awarded for periods typically of up to 10 years, although examples of longer contracts do exist. On the question of what to measure within a PBMC, it was noted that residual life is difficult to measure with a repeatable approach, and that what is being measured should reflect the reason that the PBMC was instigated in the first place.
2.4 Session 3: Recent Trends in RAM for World Bank Financed Projects

The World Bank has a long history in supporting RAM across many countries (both within the ADB’s DMCs and elsewhere). Dr. Chris Bennett of the World Bank shared his observations on RAM.

Dr. Bennett first explained the history of RAM. He noted that in the 1970s the focus was on equipment management and maintenance management. During the 1980s there was a move towards pavement management and private contractor involvement. In the 1990s road funds became more common, and the learnings from pavement management were transferred into bridge management. Agency reforms also occurred throughout the 1990s to separate out the regulator from the operator of infrastructure. During the 2000s, the improvement in IT capability saw the introduction of many integrated asset management systems, while there was a growing appreciation of the need for strong governance if RAM was to succeed. Aligning to the previous agency reforms and outsourcing of works, the use of performance-based contracts became more widely used.

Dr. Bennett highlighted the need to consider many different aspects if RAM is to be successful, with these presented in Figure 5. He explained that projects supported by donor agencies involve only a few aspects (typically data collection, systems and contracting models) and not the holistic approach needed for successful (and sustainable) RAM to occur.

![Figure 5: Aspects of Total Asset Management](Source: Dr. Christopher Bennett)
Dr. Bennett also noted that a minimum of 5 years is needed to achieve a basic level of competency on RAM in a road authority. This timeline compares unfavorably with that of many donor loan agreements, and when combined with the focus on only a few aspects of RAM (as noted earlier) results in a situation where failure is almost assured.

![Figure 6: Timescale to Embed RAM
Source: Dr. Christopher Bennett](image)

The development of a competent RAM authority requires support over a period of at least 5-8 years, as well as support across the full spectrum of components that make up RAM. It is wise to avoid trying to implement overly complicated systems (that align with an “advanced” road authority) when the authority itself is barely through the “awareness” phase of progression.

The World Bank has developed a number of sample specifications for asset management tasks including multifunction data collection vehicles, road management systems and the like. These include some simple checklists to help guide a road authority to an appropriate level of sophistication in the adopted systems and decision support tools.
2.5 Session 4: Case Study – Cyprus and Malaysia

Dr. Michael Burrow presented a dual case study covering the work completed over many years in both Cyprus and Malaysia.

Dr. Burrow commenced by emphasizing the importance of an asset management plan (AMP). The AMP helps to document identified problems with processes and outputs; ensures that the economic justification of investments and expenditures is fully understood; and that an appropriate level of investment is occurring into proper maintenance.

From his work across the two countries, Dr. Burrow identified a number of success factors for RAM, with these being:

- Suitable institutional arrangements in the road authorities concerned to allow for departmental engagement and specialization both centrally and locally.
- Budget support to operate the system, collect the necessary data and finance maintenance works that cover the entire road network.
- Proper information management by establishing databases and quality assurance procedures for data use.
- A decision support tool (i.e. computer program), which utilizes cost benefit analysis to facilitate equitable decisions regarding optimal road maintenance and to prepare annual reports.
- System that was appropriate to the personnel resources available. Staff, although not experts in management systems, were trained highway engineers capable of taking on such a system and further developing it to the needs of the assets. Such engineers were further trained to improve on their technical knowledge, including on IT systems.

As with the presentation from Dr. Bennett, Dr. Burrow’s presentation reiterated the need to consider a wider scope of activities to support RAM and also the need for a long-term involvement if RAM capability is to move to a sustainable level.
2.6 Session 5: Case Study – the Philippines

The Government of the Philippines commenced implementing RAM in 1998 – and is now into its 15\textsuperscript{th} year of implementation (with ongoing donor agency support), further reiterating the need for a long-term program to implement RAM. Ms. Nenita Jimenez, Mr. Peter Knee, and Mr. Kevin McPherson gave presentations on the Philippines’ case in this session.

The presentation focused heavily on the IT aspects of RAM, with specific IT challenges noted as follows:

- Software applications need ongoing support and maintenance after project implementation, yet there is often no funding for this;
- Government procurement rules prohibit payment of support and maintenance in advance of services, such as is required for long-term maintenance agreements for software. Software updates therefore need to be funded from the authorities’ own budget rather than through the loan that funded the introduction of the software. This, increases the chances of the system not being updated to modern versions under standard support agreements;
- Institutionalization takes a long time – the Philippines have been implementing the project for almost 15 years and is still receiving ongoing support;
- Organizational structures in government departments are difficult to change, and the system needs to be able to work with the structures in place;
- Staff turnover was a major challenge, with so many new staff with little training in their new roles. This made initial progress harder, but also freed up the authority from dealing with legacy personnel issues;
- Maintenance and update of data and systems needs to be considered from the outset – how will it be paid for, who is responsible etc.; and
- Procurement for annual roughness, traffic and visual condition surveys was a problem as there was little capacity in the national consultancy market. Ideally these can be let as multi-year contracts; however the government and donor procurement systems struggle with these and require special approval to progress. It is desirable to attract and encourage local firms to invest in survey equipment.

Key success factors can be summarized into People, Processes and Technology as per below.

- People
  - Presence of an organizational unit
  - Allocation of budget
- Clear job descriptions and career path
- Appropriately qualified staff (road network management, data collection, data quality assurance, management reporting)
- Continual training and development
- Commitment to continual improvement

• Processes
  - Agency must follow basic asset management principles
  - Annual reports / business plans should be prepared using Road Management System (RMS) outputs
  - Commitment of leadership
  - Policies and procedures for RMS operation have to be well developed
  - Continual quality improvement needs to take place

• Technology
  - Appropriateness of Technology
  - Strong IT division
  - IT Strategy
  - RMS must fit into the IT Strategy
  - RMS must be properly supported by the agency
  - Use of Commercial-Off-The-Shelf (COTS) systems versus customized development – pros and cons to both approaches.

### 2.7 Session 6: Case Study – New Zealand

Dr. Theuns Henning presented a case study on the development of RAM in New Zealand. New Zealand is widely regarded as being one of the early adopters of RAM and one of the leading examples in the use of RAM.

The first notable aspect of Dr. Henning’s presentation was that concerning the timeline of development of RAM within New Zealand. As is illustrated within Figure 7, RAM (in one form or another) has been under progress since the mid-1970s. Additionally, there was some 20 years of experience with various contracting models and decision making approaches before the first performance based contract was let, or the introduction of sophisticated decisions support tools (dTIMS) occurred.

![Figure 7: Timeline of RAM development in New Zealand](Source: Dr. Theuns Henning)
As opposed to the “one size fits all” approach that many road authorities have adopted for their physical maintenance contracts, New Zealand has traditionally used a variety of models. There is an understanding that each contract model offers something different in terms of RAM to both the road authority and to the contracting/consulting industry. As part of its evolutionary process of refinement and continual improvement, the New Zealand Transport Agency has developed a new contract model, with the key benefits from both the existing hybrid and performance specified maintenance contracts being leveraged into the Operations and Maintenance Outcome Contract (OMOC) as illustrated in Figure 8.

![Diagram of innovation by contractor to achieve KPIs, knowing the exact outcome, savings from single supplier, some minimum quantities – not sufficient for KPIs, 6 to 9 years, single supplier model.]

In summary, Dr. Henning raised the following issues:

- There is a need to have a sound understanding and baseline to both support change and to benchmark the impact of the changes made.
- Holistic approach to how RAM is conducted is necessary. Cannot just make changes in one aspect of RAM.
- Procurement is a small yet important part of asset management. It is necessary to understand how the different procurement models align to the authorities’ desired position with regard to public/private involvement, risk management, cost certainty and other key RAM items. Once these are understood, a procurement plan should be developed which may require the use of more than one contractual model.
- For all contractual models, one must know what to ask for to satisfy asset management needs. Outsourcing is not a means of avoiding the core RAM activities.
2.8 Session 7: Panel Discussion

The panel session consisted of seven pre-attended questions to the panelists, a further three questions taken from the participants over the prior one-and-a-half days of the workshop, and several questions from the floor. The panelists comprised Dr. Christopher Bennett, Dr. Michael Burrow, Dr. Theuns Henning, Ms. Nenita Jimenez, and Mr. James Leather. Dr. Ian Greenwood moderated the session.

- **Question 1:** Over the past decade there has been an ever-increasing development of AM guidelines and standards that have by and large focused on how to make refinements to an otherwise sound AM process. Is there a need for an international guideline on AM for road authorities just starting out to cover the basics of what information to collect, the form of service levels, a basic AM Plan template and the like?
  - Yes. People often latch on to the cutting edge initiatives occurring in the more advanced authorities and fail to take advantage of the many benefits that are available from undertaking the basics of RAM well.
  - There is an issue though around the maintenance of such a knowledge product. Who would maintain them, are they easy to find? History suggests that while a RAM maturity assessment model for developing nations would be useful, the production of a broader knowledge product would be difficult to keep current.

- **Question 2:** Assistance on RAM is provided by development partners in various forms. How do you estimate the requirement of financial and human resources to prepare and implement a project for building RAM capability and capacity? What should come from the development partners, and what should come from the government?
  - Almost impossible to estimate. A case-in-point is that of the Philippines which has had ongoing support for the past 15 years. At some stage the road authority needs to self-fund the initiative as part of everyday activities rather than RAM being a donor supported project. The important part is to keep it simple, gain credibility and then move forward from a sound base.
  - The important aspect is to target a sustainable level of RAM. This may to target just the basic (or core) functions and not worry about implementing advanced decision support tools. The Philippines believe they will keep going post the current World Bank loan, although they commented that it “was very expensive”.
  - Is spending less than 0.2% of budget to make sure the other 99.98% is spent well inappropriate? The panel agreed that this level of funding is self-justified by the efficiency gains.
• Question 3: When development partners invest on a road project, a commitment from the government on long-term maintenance budget is usually sought. Is such a commitment meaningful and/or helpful to the sustainability of sector outcome? If not, what will you do?
  – A direct impact of such an approach is that it introduces potential risks to public financial management.
  – This is a complicated issue and if not carefully managed then there is the potential to severely restrict the government from making overall budget decisions (such as the trade-off between roads, health, education etc.). Ideally there needs to be an incentive to the maintenance and not just rules.
  – Sometimes the implementation of such a requirement simply transfers what limited maintenance funds that do exist from being spread around the network, to instead be concentrated on one or two roads. We need to ask if this is in the best overall interest of road users.

• Question 4: Should development partners provide financial support to developing countries on road maintenance? If so, what is the best approach?
  – Historically development partners were very reluctant to fund routine maintenance, but are now more open to such proposals.
  – Borrowing money for maintenance has historically been seen as counter-intuitive. If a country cannot afford to maintain the assets they already have, then building additional assets (liabilities) will only make matters worse.

• Question 5: When little interest about road maintenance is shown in the government counterpart, how should the efforts on building road asset management capability and capacity be initiated?
  – The key is to be talking to the right people – which is often the finance team rather than the engineering department.
  – It may be possible to create a RAM team, or identify a senior official who will champion RAM.
  – There needs to be a vested interest in implementing RAM. Can they get more money if they undertake RAM?

• Question 6: Information management systems and decision support systems have become increasingly complex and often fail within several years of implementation in developing nations. Should we be concerned and is there a way to avoid this? COTS systems, versus custom built IT solutions – your view on what is best and why?
  – COTS systems have been shown to have the best sustainable legacy for RAM, as well as higher user satisfaction ratings.
  – However, software vendors are salesmen and need to be considered in that light. Many failures however, are where the road authority had no formal business processes against which the system was intended to support. There is also the need to ensure that there is funding for the annual maintenance fees to occur.
• Question 7: What is the most important principle you will follow to assist the government in building the road asset management capability and capacity? What is the most risky area/stage you will be cautious on?
  – It is important to have top-level buy-in to RAM. If this isn’t present then there is very little chance of success.
  – It is pertinent to produce an annual report to publicize what has occurred, what the challenges are and what can be delivered for various levels of funding.
  – There is a need to identify the specific skill sets, invest in the young staff to develop these and wean off consultants for core roles.

• Question 8: Are there any objective methodologies to determine the maturity of a road agency’s asset management system? This will be important to develop consensus amongst government and development partners in assessing the sector’s future needs.
  – Within the World Bank's sample specification on road management systems, there is a client assessment process. The assessment process is noted as “a mechanism to evaluate the existing situation of the Agency in various key areas needed to implement an RMS”. An RMS will not function in isolation from the organization, instead it should become an integral part of the organization, and as such it depends on other key functions being in place. There should be a natural 'receiver' of the RMS, so as to create commitment and ownership. The Key Assessment Areas considered are Human Resource Development, Information Technology Infrastructure, Road Network Referencing, and Data Collection.” Figure 9 provides an overview of the assessment process taken from the World Bank specification.

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**Figure 9: Client Assessment Process**

- The Institute of Asset Management (United Kingdom) has an assessment framework, which may be too advanced for a developing authority.

- Question 9: The ADB is developing a road and bridge Public-Private-Partnership (PPP or P3) in Luoyang City (PRC) with a maintenance services period of 10 years. The assumption is that the owner would need to overlay the road on taking ownership. What advantages/disadvantages are involved in a longer maintenance period of say 20 years?
  - Issues that require consideration include the time needed to repay the loan, the risks that can be better managed with a longer time period, the ability to manage different contract periods etc.

- Question 10: In the late 1980's, World Bank's report “Road Deterioration in Developing Countries” concluded with a recommendation to donors not to invest in road construction in the countries that have shown they can't maintain them. Instead, the report proposed focusing exclusively on road maintenance and rehabilitation. Twenty-five years later, is this recommendation still relevant?
  - Ideally yes, but there is a need to recognize the rights of a country to determine their own priorities. With so many different sources of funds available to a developing country, idealistic approaches from one development partner would likely result in the funds being borrowed from another source.

- Question 11: Bridge Management Systems – where do these fit in?
  - Bridges are a key part of an overall road network and so are by default included into the RAM.
  - Bridge management systems have tended to focus on regular inspection of the bridges rather than trying to predict future conditions using decision support tools.
3 Workshop Closing Remarks

To close the workshop, Ms. Sri Widowati, Director, Transport and Communication Division, South Asia Department of ADB addressed the speakers and participants of the workshop. She reminded participants about ADB’s vision of a region free of poverty, and how transport, as one of the main sectors supported by ADB, should play an important role in enabling economic development and poverty reduction.

Ms. Widowati highlighted ADB management’s concern on the sustainability of investments that ADB is supporting, and how the inclusion of a component on RAM in projects would answer such concerns. She also challenged participants to ask themselves what the proper way of doing RAM should be in the light of current road maintenance problems in both DMCs and developed countries alike. She also noted that while high-quality knowledge is still in demand, international best practices are not readily available for replication.

She underscored that ADB also must address an important concern of DMC officials, which is the way they should balance their resource allocation between new infrastructure construction and existing asset maintenance. Is this a technical or political challenge? Will building new infrastructure bring more development than routine and period maintenance? While there may be different answers to these questions, it is an important concern. In this regard, Ms. Widowati said that more convincible approaches to optimize the resource allocation in ADB and in the DMCs are required in policy dialogues.

She further stated that while ADB has assisted our DMCs in road asset management for many years using a range of different approaches, its role is also evolving. ADB used to consider road maintenance as the responsibility of the governments and asked the government to promise its budget allocation. Based on the debate on this approach in the earlier panel discussions, Ms. Widowati called on participants to think about how to move forward. She also encouraged the transport community to think more innovatively about ADB’s role in RAM, adding that there is a need for patience and pragmatism in ADB’s operational approach. ADB-funded projects have seen many failures due to over-ambitious sector reform and idealized work plan, and so there is a need to minimize the waste of resource by attempting to understand DMCs, RAM, and the nature of development.

As a final note, Ms. Widowati expressed her hopes that the development of RAM will not stop with the conclusion of the workshop, adding that the more that we continue these discussions, the better prepared ADB will be to assist our DMCs in achieving a sustainable road sector, and finally closing the infrastructure gap for a poverty-free Asia and Pacific region.
4  Workshop Key Findings, Conclusions and Actions Moving Forward

4.1  Workshop Evaluation

A post-workshop survey of the participants was undertaken to assess the value of the workshop to improving the knowledge of RAM within the ADB participants. The post-workshop survey of participants indicated a high level of satisfaction with the workshop, with 100% of respondents rating the workshop as either Satisfactory or Very Satisfactory across the categories of Content, Relevance, Duration, Use and Quality of Materials.

Other indicators of the workshop’s success include the following:

- 87% of participants rated their program experience as completely or almost completely satisfactory.
- 87% of participants either completely or almost completely agreed that the workshop prepared them sufficiently well for adapting their learning to their work environment.
- All participants were either satisfied or very satisfied by the workshop’s content and its relevance to their work.

4.2  Key Conclusions and Actions

Much of the workshop was about raising awareness of RAM amongst the participants rather than developing specific ‘next steps’. The reason for this is that each of the member countries and the participants that are supporting them, are at different stages of understanding and their actions to improve RAM will therefore also be unique. However there were several themes that came through that are worth noting as key conclusions and/or actions from the workshop, with these being:

1. RAM needs to be considered an integral part of projects and loan arrangements, and not just an add-on to capital improvement projects. To achieve this, additional RAM capability to support projects in the loan development phase will likely be required;
2. A RAM maturity assessment that is applicable to those authorities just commencing RAM is required. Current maturity assessment methods are for advanced authorities seeking ISO accreditation or similar and do not provide sufficient support for those just starting out;
3. A long-term (5-10year) plan is required for the establishment of a sustainable RAM program within a road authority (based on the findings of the maturity assessment); and
4. IT systems and associated data collection should be kept to a minimum level to increase the chances of attaining a sustainable RAM outcome.
5 Appendices

Appendix A: Workshop Agenda

Day 1: 26 November 2013
Venue: Auditorium C

Morning Session

8:30 – 9:00 Registration

9:00 – 9:15 Welcome and Introduction Remarks
Mr. Gil-Hong Kim, Director, Sustainable Infrastructure Division
Regional and Sustainable Development Department, ADB

9:15 – 10:45 Session 1: Recent Developments in Road Asset Management - Technology
Moderator: Mr. Chen Chen, Transport Specialist, SARD, ADB

Recent technology changes have resulted in progress in the management of road assets. This session will focus on data collection, network referencing, information systems, decision support tools, and measures addressing climate change.

Speakers
Dr. Ian Greenwood, Infrastructure Asset Management Consultant, New Zealand
Dr. Michael Burrow, University of Birmingham, United Kingdom
Dr. Theuns Henning, University of Auckland, New Zealand

10:45 – 11:00 Morning Break

11:00 – 12:30 Session 2: Recent Developments in Road Asset Management – Institutional Enhancement
Moderator: Mr. Daisuke Mizusawa, Infrastructure Specialist, PARD, ADB

Road authority plays a major role in the overall performance of road asset management. This session will discuss topics such as road sector reforms, performance based contracts, PAS55/ISO55000, road funds and Asset Management Planning.

Speakers:
Dr. Ian Greenwood, Infrastructure Asset Management Consultant, New Zealand
Dr. Michael Burrow, University of Birmingham, United Kingdom
Dr. Theuns Henning, University of Auckland, New Zealand

12:30 – 14:00 Lunch
Afternoon Session

14:00 – 15:15  Session 3: Recent Trends in Road Asset Management for World Bank Financed Projects
Moderator: Mr. James Leather, Principal Transport Specialist, SERD, ADB

The World Bank has a long history with road asset management and pioneered many of groundbreaking improvements in the sector for developing nations. This session will focus on recent trends in WB’s projects, and reflection on some lessons learnt.

Speaker:
Dr. Christopher Bennett, Senior Transport Specialist, The World Bank

15:15 – 15:30  Afternoon Break

15:30 – 16:45  Session 4: Case Study: Cyprus
Moderator: Chen Chen, Transport Specialist, SARD, ADB

The session will review and discuss Cyprus’ experience in implementing system improvements towards road asset management, which includes: funding, scheduling and drivers for improvements, achievements, contract and procurement models, challenges, plans for the future and key learning.

Speaker:
Dr. Michael Burrow, University of Birmingham, United Kingdom

16:45  End of Day 1
Day 2: 27 November 2013
Venue: Auditorium C

Morning Session

8:30 – 9:00  Registration

9:00 – 10:15  Session 5: Case Study: The Philippines
Moderator: Daisuke Mizusawa, Infrastructure Specialist, PARD, ADB

This Case Study will review and discuss issue in implementing road asset management in the Philippines, which includes funding, scheduling and drivers for improvements, achievements, contract and procurement models, challenges, plans for the future and key learning.

Speakers:
Ms. Nenita R. Jimenez, Planning Division, Department for Public Works and Highways, The Philippines
Mr. Peter Kne, National Road Improvements and Management Program Phase 2 (NRIMP 2) Consulting Team, The Philippines
Mr. Kevin McPherson, National Road Improvements and Management Program Phase 2 (NRIMP 2) Consulting Team, The Philippines

10:15 – 10:45  Morning Break

10:45 – 12:00  Session 6: Case Study: New Zealand
Moderator: James Leather, Principal Transport Specialist, SERD, ADB

New Zealand has a strong history of international leadership in implementing road asset management. This session will review the experience of New Zealand to date, the drivers for the current changes, and plans for the future.

Speaker:
Dr. Theuns Henning, University of Auckland, New Zealand

12:00 – 14:00  Lunch
Afternoon Session

14:00 – 16:00  Session 7: Panel Discussion: The Future of Road Asset Management  
(Open Session)  
Moderator: Ian Greenwood, Infrastructure Asset Management Consultant, New Zealand

The panel session will discuss a range of road asset management issues that influence ADB’s developing member countries, practitioners and development organizations. Audiences are invited to submit their questions to the Moderator prior to this session.

Panelists:  
Mr. James Leather, Principal Transport Specialist, SERD, ADB  
Dr. Christopher Bennett, Senior Transport Specialist, The World Bank  
Dr. Michael Burrow, University of Birmingham, United Kingdom  
Dr. Theuns Henning, University of Auckland, New Zealand  
Ms. Nenita R. Jimenez, Planning Division, Department for Public Works and Highway, The Philippines

16:00 – 16:15  Closing Remarks and Adjournment  
Ms. Sri Widowati, Director, Transport and Communication Division, South Asia Regional Department, ADB

16:15 – 17:30  Reception
## Appendix B: List of Participants

### ADB Staff

<table>
<thead>
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<th>DEPARTMENT / DIVISION</th>
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<th>NAME</th>
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Appendix C
Workshop Presentations

Session 1: Technology

Dr. Ian Greenwood – Introduction to RAM
Dr. Michael Burrow – Overview of RAM
Dr. Theuns Henning – Data Collection and Reporting – Level of Service and Performance Monitoring

Session 2: Institutional Enhancements

Dr. Theuns Henning – Asset Management Planning
Dr. Michael Burrow – Road Sector Reforms
Dr. Ian Greenwood – Performance Based Contracting, AM Maturity Assessment and AM Standards

Session 3: Recent Trends in RAM for World Bank Financed Projects
(Dr. Christopher Bennett)

Session 4: Case Study – Cyprus & Malaysia
(Dr. Michael Burrow)

Session 5: Case Study – The Philippines
(Ms. Nenita Jimenez, Mr. Peter Knee and Mr. Kevin McPherson)

Session 6: Case Study – New Zealand
(Dr. Theuns Henning)