2014

Preventative Maintenance for Selangor State Roads:

A Working Paper

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1.0 INTRODUCTION

1.1 This paper is motivated by two conversations. The first was a conversation between YB Sivarasa, MP for Subang and myself, where we shared our experiences as Selangor MPs dealing with a stream of complaints on the terrible state of our roads.

1.2 The second conversation was with Mr. PY Wong, a civil engineer living in Subang Jaya and Tindak Malaysia activist. Upon my request, PY dropped by my office to introduce me to road repair concepts and most importantly the concept of "timely preventive road maintenance".

1.3 My interns and staff also did desktop studies on road repair systems used in Canada, Australia and UK. We also met and interviewed several civil engineers from IKRAM on the matter who provided technical explanations and costings. We also met representatives of the Institution of Engineers Malayasia who gave us independent views.

1.4 This is a concept paper, it is not a comprehensive detailed report. However, it represents a recommendation to the Selangor State Government to start detailed studies and run cost benefit numbers.

2.0 BACKGROUND

2.1 The roads that the State government are responsible for can be roughly divided into two groups; municipal roads and state roads. There is roughly 7,500 km of municipal roads and 3,700 km of state roads. In total, Selangor state is in charge of maintaining 11,200 km of road.

2.2 The Federal government allocates a special fund called MARRIS (Malaysian Road Records Information System) to help Selangor to maintain its municipal and state roads. The size of the allocation is dependent on the number and length of roads in Selangor. In 2014, the MARRIS allocation was RM564.64 million.

2.4 For 2014, municipalities (PBT) received RM214 million. Whereas JKR Selangor received RM156 million. In addition, each ADUN received RM3 million each totaling RM168 million but we are not exactly sure how this fund is managed.

2.5 Is the MARRIS fund finding its way to road maintenance and repairs?

3.0 CURRENT SITUATION

3.1 Other than garbage collection and water woes, the poor state of Selangor roads is a major challenge for the Pakatan Rakyat government. A rethink is needed on how to utilize the MARRIS fund and plan the spending of the money.

3.2 During TSKI administration, the Selangor government had inexplicably under-spent on road repairs. Initial estimates based on news reports suggest that the Selangor government may have under-spent the MARRIS allocation by as much as 40%. A complete audit of the MARRIS fund usage by the Selangor government is recommended.

3.3 Even when a seemingly large number is allocated, the actual spending on the ground also tells a very different story. In 2014 whilst JKR Selangor received RM156 million for state road repairs, only a sum of RM35 million was actually issued to the contractor to maintain all the state roads. From this RM35 million, RM24 million was for routine repairs and a mere RM11million for periodic repairs. Routine repairs are works involving grass cutting, patching up potholes, cleaning drains. Periodic repairs involve resealing and re-gravelling, heavy works that need to be carried out every 3 years.

3.4 In November 2014, the new AA administration, increased the allocation for municipalities and also promised to spend 100% of MARRIS funds directly on roads. Previously, the MARRIS funds is even used to pay for wages of civil servants. This is a positive direction by the new MB.

4.0 SOLUTION

4.1 The solution is to re-think how to allocate the MARRIS budget for maximum results.

4.2 The fundamental principle in policy making and implementation is all economic and policy decisions must be based on data. In the matter of road maintenance, this principle applies too. The data we need is a collection of real and reliable data on the conditions of all state roads in Selangor.

4.3 Road maintenance data can be collected by way of scanning the roads with multi laser profiler and deflectometers. These road assessment machines can be deployed to test the whole 11,200 km of state and municipal roads in Selangor.

4.4 IKRAM estimated the cost of scanning and assessment to be RM22 million (RM2,000 per km x 11,200 km) and the project will take about 6 months to complete. RM22 million is less than 4% of the total MARRIS funds for 2014. This is a relatively small amount to pay for reliable data and knowledge.

4.5 Once the data is collected and analysed, then Selangor can actually plan and schedule the repairs of all its roads properly and more efficiently. We can also immediately allocate priority repairs and schedule periodic preventive maintenance.

4.6 When preventive maintenance is implemented, we will see dramatic reductions in potholes and overall road maintenance costs. Based on our desktop studies on the Canadian experience, the implementation of such preventive maintenance system resulted in 25% savings in the overall budget. See the attached Appendix A for details.

4.7 IKRAM also said that with planned and scheduled maintenance, the durability lifespan of Malaysian roads can be extended from the current fragile 3 years to at least 5 to 7 years. This implies potential savings of up to 50%.

4.8 As a concept, preventive road maintenance is not new. It has been around since the 1970s. With great advances in scanning technology since then, preventive maintenance is the preferred option in all developed nations. It is also cheaper and gives greater comfort and more importantly, better safety to road users.

4.9 The reason why "timely preventive road maintenance" hasn't taken off in Malaysia is simply systemic corruption. Authorities have deep vested interests to dish our more road repair contracts to their cronies. In order to do this, arbitrariness (doing things without planning or data) and shoddy repairs are allowed to flourish. This has resulted in more repairs over shorter time periods. Selangor must change this practice!

APPENDIX 1

Summary: Timely Preventive Maintenance for Municipal Roads — A Primer

In this paper, the preventive maintenance principle is elaborated using engineering and economic terms. Preventive maintenance in sum is the practice of treating symptoms early on to avoid long term deterioration.

By adopting this principle, all stakeholders of infrastructure would save money and time in the long term because there would be less necessity for constant treatment.

Engineering terms

The paper stressed the use of appropriate materials and treatments for the job, made possible through pavement surveys that examine the condition of the roads and the exact location of the area in need. These surveys also determine the right time for repairs and the appropriate means of repair, and monitor the effectiveness of the given means of repair.

Although the means of repair seem simple, they must be applied appropriately through road surveying, and the applications are summarised as below. Almost all treatments are designed for less severe conditions, which imply that treatment should be applied as early as possible.

Preventive Maintenance Treatment	Pavement Condition for Successful Application											
	Roughness		Rutting		Longitudinal & Transverse Cracking		Ravelling		Flushing		Fatigue Cracking	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
Crack Sealing												
Chip Seal												
Slurry Seal												
Micro-Surfacing												
Thin Overlay												

Legend:

- Acceptable application
- Questionable application
- Do not use

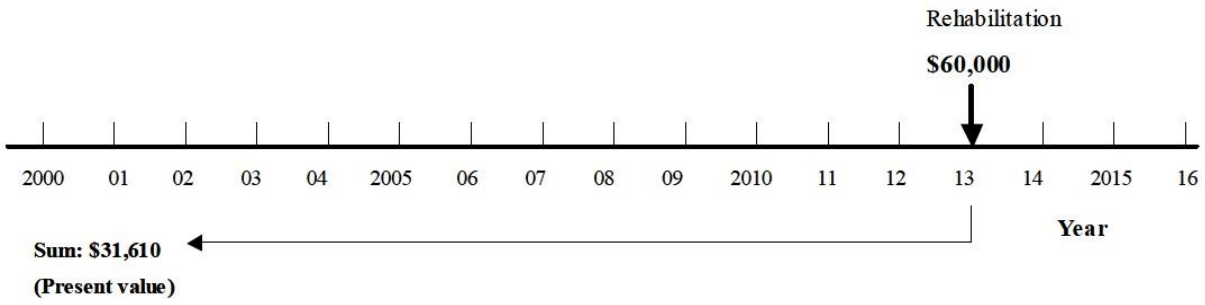
Moreover, the decision-making process behind choosing appropriate treatments involve economic and policy reasoning before choosing particular treatment methods.

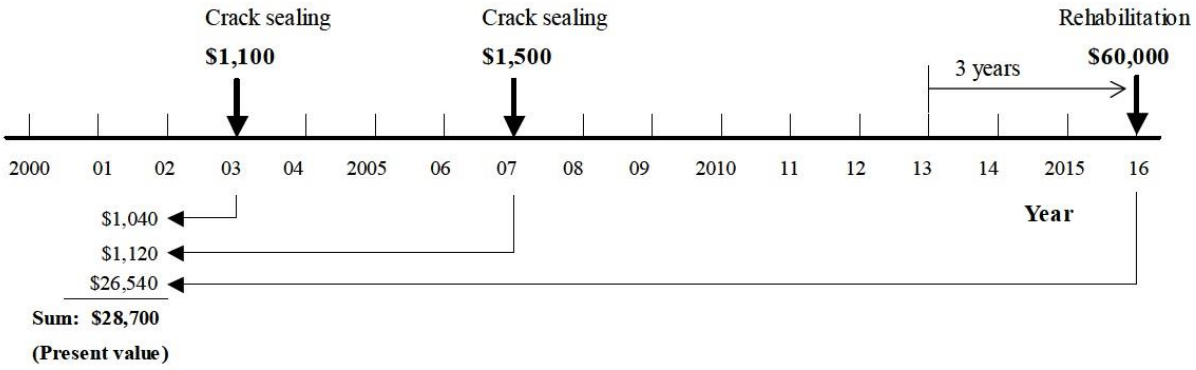
Economic rationale

Economic theory is also applied; throughout the paper there is the use of cost-benefit analysis to rationalise the long-term benefits of early treatment of roads. Decision processes include:

- Cost benefit evaluation
- Ranking
- Life cycle cost evaluation
- Decision trees

These decision processes consider both the material implications on the infrastructure and the socio-economic costs such as traffic disruption. Furthermore, many of the means of treatment cost lower than rehabilitation or corrective measures, thus justifying the net benefit of early road treatment. For example, in appendix A it is estimated that pavement life would be extended by about 3 years with preventive maintenance treatment. In fact, there is a predicted saving from $31,610 to $28,700:





Accordingly, preventive measures bring a saving of $600 a year, or about 25% a year, because of the extended pavement lifespan. More superior treatment materials would also decrease the number of times necessary for and the time between repairs.

Implementation

In summary, effective implementation of the above requires agents to:

1. establish management aspects of the program;
2. establish technical aspects of the program;
3. determine maintenance needs;
4. provide framework for treatment selection;
5. set priorities for needs; and
6. provide ongoing support, monitoring and assessment.

Implementation requires both attention to the technical maintenance requirements and a continuous duty of care. Only then would the maintenance be truly preventive and less reactive.