

Comparison of Network Level Recommendation and Project Level Rehabilitation Treatment for Pavement

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INTRODUCTION

- Alberta Transportation (AT)'s mandate includes managing the provincial highway network with over 32 thousand kilometers in total length that covers highway classes from the National Highway System to the local roads.
- AT has been utilizing a computerized pavement management system (PMS) for the management of the Alberta's provincial pavement network since the early 1980's. The PMS database contains historical "As-built" construction data as well as measured performance data, such as distress ratings, IRI/Rut depth and the deflection (FWD) test results.
- The PMS implemented within HPMA allows AT to configure the database and conduct analyses to produce multi-year pavement rehabilitation recommendation lists (Network Level recommendations with location, treatment and need years).
- Once a pavement rehabilitation project proceeds to the design stage, it is expected that the decisions made at the project level may differ from the treatment recommended at the network level.

OBJECTIVES

This study is focused on the differences and/ or similarities between the recommended activities at the Network Level, based on the pavement condition data collected each year, and historical "As-built" pavement information, which reflects the final design for pavement treatment activities (Project Level).

Figure 1: Network Level Recommendation in 2007 Was to Overlay The Pavement (>129 mm) With a Need Year of 2008. In 2010 The Hwy Section Went Through a Full Depth Reclamation and Over Lay.

2007 HPMA List (Network Level)					As-Built List (Project Level)			
HS_ID	begin_KM	end_KM	act_number	need_year	HS_BEGKM	HS_ENDKM	HS_ACTIVITY	HS_YEAR
PH 43-4-R	0	4.83	14	2013	0	2.15	1	2010
PH 22-24-C	6.969	33.14	23	2008	14.95	16.46	10	2010
PH 22-24-C	6.969	33.14	23	2008	14.95	16.46	10	2010
PH 22-24-C	6.969	33.14	23	2008	16.46	26	10	2010
PH 22-24-C	6.969	33.14	23	2008	16.46	26	10	2010
PH 22-24-C	6.969	33.14	23	2008	26	28.1	10	2010
PH 22-24-C	6.969	33.14	23	2008	26	28.1	10	2010
PH 22-24-C	6.969	33.14	23	2008	26	28.1	5	2010
PH 22-24-C	6.969	33.14	23	2008	28.1	30.04	10	2010
PH 22-24-C	6.969	33.14	23	2008	28.1	30.04	10	2010
PH 22-24-C	6.969	33.14	23	2008	30.04	32.34	10	2010
PH 22-24-C	6.969	33.14	23	2008	30.04	32.34	5	2010
PH 22-24-C	6.969	33.14	23	2008	30.04	32.34	10	2010
PH 22-24-C	6.969	33.14	23	2008	32.34	33.14	10	2010
PH 22-24-C	6.969	33.14	23	2008	32.34	33.14	10	2010

STUDY APPROACH AND COMPARISON RESULTS

- Highway sections with the start and finish kilometer point within 500 meters of each other, are grouped together.
- Treatment activities are only comparable if they were within 5 years of the recommended "need year" by PMS.
- Figure 1 is an example of the comparison approach between 2006 PMS recommendation list and the As-built database.
- Overlay thicknesses were compared to find out the differences in between the PMS predictions and the final design.

Figure 2: Number of Hwy Sections Reconstructed at Project Level Despite a Thick Overlay Recommendation in Network Level

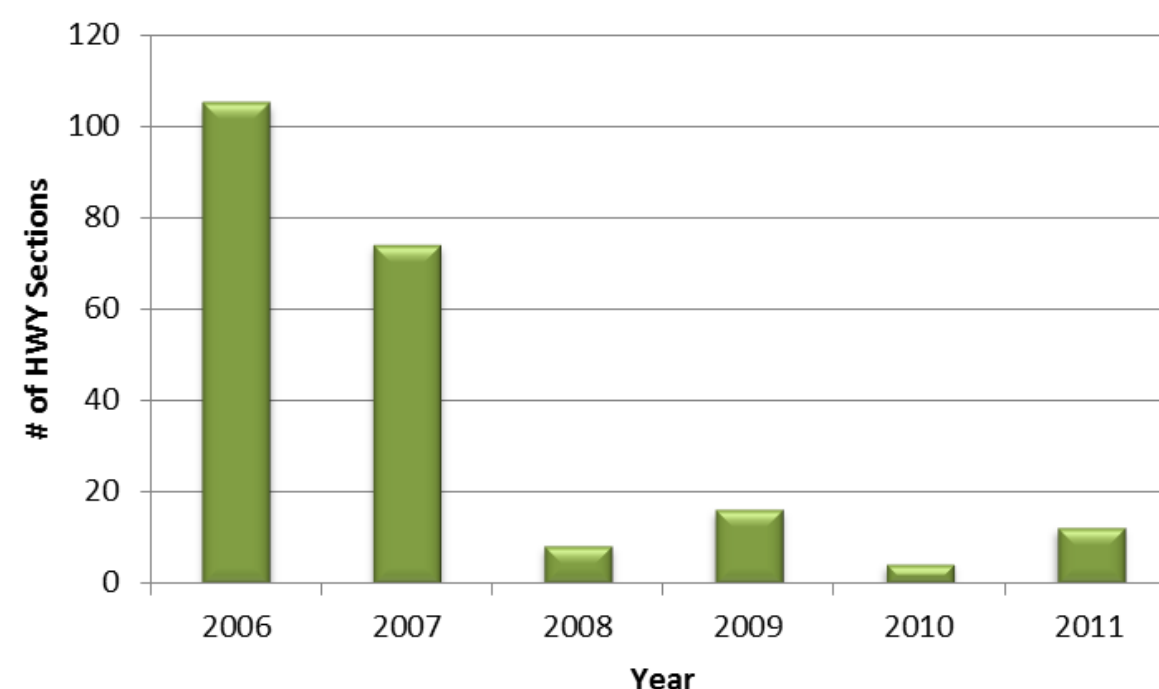


Figure 3: Thicker OL and Mill & Inlay/Overlay design at Project Level instead of overlay design at Network Level

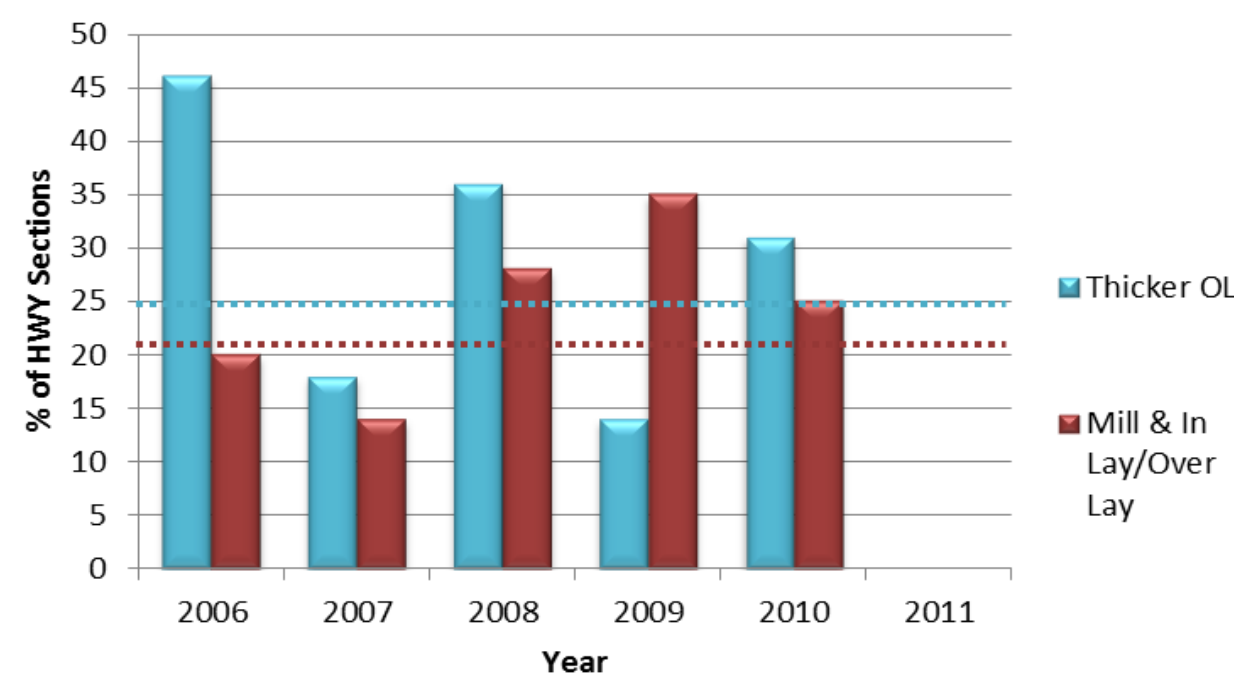
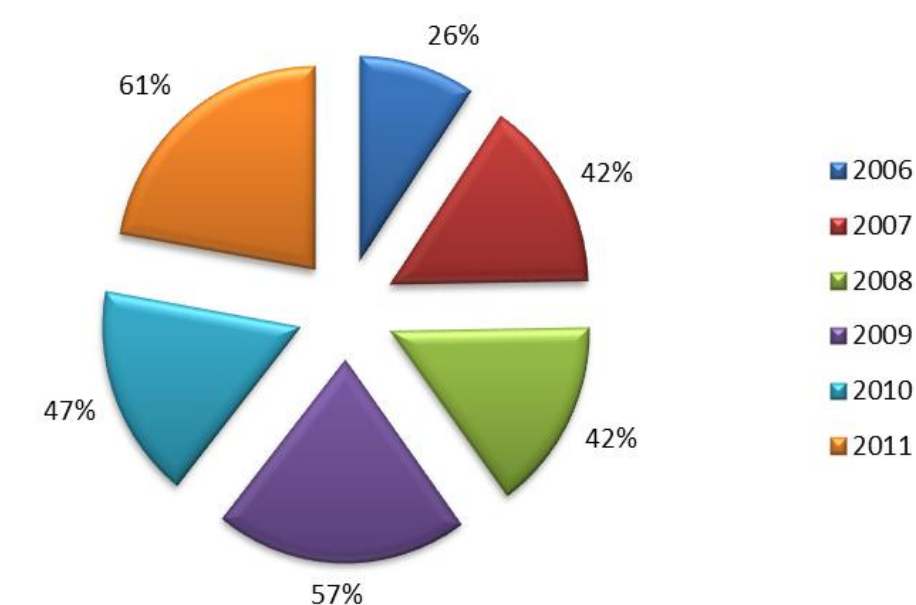


Figure 4: Percent of Matching Treatment Activities at Network Level in Comparison with Project Level in Different Years



SUMMARY AND CONCLUSIONS

- This study concludes that when the existing pavement structure is weak; PMS recommends thick AC overlays, while the project level decision may change to reconstruction or Full-Depth Reclamation (FDR). This is considered a good match, since the PMS does not predict reconstruction. Figure 2 shows the number of segments that fall in this category over the study period.
- There is a tendency that the Project Level designs produce thicker AC overlays than what is recommended at the Network Level. The blue bars in Figure 3 show that this happens approx. 24 percent over the years. The reason can be associated with the fact that the network level analyses are based on numerical average FWD results over a section of pavement while Project Level designs are typically base on engineering judgment.
- Another 20 percent of middle to thin AC overlay recommendations had turned into Mill and Inlay or Mill and Overlay treatments in the As-built data, as shown by the red bars in Figure 3. This scenario indicates agreements between the network level analyses and the Project Level designs, both indicating the pavement structural needs are minimum to moderate.
- Overall the Network Level recommendations match the Project Level designs in approximately 40 percent of rehabilitated highway sections, see Figure 4. The study concluded many factors affecting the decisions made at the Project Level. In general, Network Level recommendations are based on a higher level of predictions compared to the Project Level, where the focus is on shorter segmentation of the highway and more inclusive visual pavement condition inspections.