

CHAPTER 7

CONCLUSION AND FUTURE RESEARCH

7.1 CONCLUSION

The main aim of present thesis is directed to anchoring of crumb rubber modified bitumen using various additives. This research provides a new approach to develop crumb rubber modified bitumen using different additive without milling operation which further make the products cost effective and energy efficient. The present research work also provides an alternate way for the disposal of waste plastics and waste tyres rubber keeping the environment free of pollution.

Following conclusions can be drawn from the research work:

- Crumb rubber modified bitumen doped with long chain amines produces a remarkable improvement in storage stability. Crumb rubber particles gets absorb in the oil portion of bitumen causes an increase in viscosity of modified blend. Incorporation of long chain amines in the crumb rubber modified bitumen may increase the saturated portion of bitumen which further enhance absorption of crumb rubber particles and lead to improve storage stability of modified blends.
- Crumb rubber modified bitumen doped with polyamine along with fatty acid was also found to enhance the storage stability of CRMB. Long chain amide may be developed inside the body of bitumen which further improves storage stability, rheological and performance properties.
- The present study explores the use of aminolysis process for synthesis of PET derivative. This process employing green chemistry approach for conversion of environmentally hazardous waste PET into PET amine derivatives. Synthesized PET derivative was used for anchoring of CRMB. CRMB doped with PET derivative also found to enhance storage stability.

- It has been observed that bitumen doped with PET derivatives along with a bifunctional compound further found to enhance storage stability. Other physical and rheological and performance properties were also enhanced as compare to conventional CRMB.
- PET derivatives along with bifunctional compounds doped crumb rubber modified bitumen in present work was found to possess high rutting resistance, good low temperature thermal cracking and low fatigue with high storage stability and also be applicable for extremely heavy vehicle traffic condition.

7.2 FUTURE RESEARCH

We have used long chain amide for anchoring of crumb rubber modified bitumen. Long chain amines or amides have long chain structure which is compatible for hydrophobic molecules. Meanwhile synthesized additive also has amide group moiety which is compatible for hydrophilic compounds. Because of this dual nature, the synthesized additive may be applicable for bitumen emulsion application. The additive may be used as emulsifier for producing bitumen emulsion. Furthermore, due to polymeric nature of synthesized additive, it may also be further applicable for bitumen PMB (polymer modified bitumen) emulsion technology in future.