7.0 SUMMARY

7.1 Conclusions

The following conclusions can be drawn based on the results of this study:

1. There were no significant differences among the means of the response variables, first sensor deflection (d_1), subgrade resilient modulus (M_r), and effective pavement modulus (E_p), for the years 1993, 1994, and 1995. However, significant differences were observed between the first sensor deflection values in 1996 and 1993 for both FDBIT and PDBIT pavements. Therefore, FWD tests up to a 3-year interval at the network level would yield statistically similar pavement responses and layer properties.

2. At the network level, FWD tests on more than 20% of network mileage will not significantly increase the precision of the mean first sensor deflection value. Therefore, at the network level, FWD tests on 20% of the mileage appear to be a valid statistical choice and could be selected as a reasonable sample size in structural evaluation of asphalt pavements. For KDOT, it would translate into approximately 2,200 lane-miles of testing over three years or approximately 750 lane-miles each year. The average percentage of error for seven, five, and three FWD tests per mile does not vary significantly. Therefore, three tests per mile can be taken as the minimum test frequency at the network level. This testing would be necessary for network level structural evaluation of the KDOT pavements and also for using/updating the models developed in this study. The *decrease* in the structural number values obtained from the models developed in this study was about 50% higher than the KDOT design assumption.

3. PSE rating is a very important attribute in the project prioritization process of KDOT and

the current PSE rating system has discrepancies. The classical regression models proposed in this study predict the PSE values by taking into account the FWD data, age, thickness, and distress level of pavements and hence, is representative of the actual structural condition of the pavement. The proposed models very closely approximate the present PSE ratings obtained at the district level.

The following conclusion was drawn by Chowdhury *(1998)* in his study of the Bayesian regression methodology:

1. The models obtained from the classical and Bayesian regression are very similar in form and they yield statistically similar results when tested on a different set of pavements. Both the classical and the Bayesian regression models appear to be statistically sound from the view point of predicting capability and model utility since they pass the individual statistical tests. Although very similar in form, the Bayesian regression models yielded slightly better results during testing.

7.2 Recommendations

1. FWD tests are recommended to be performed at 3-year intervals at the network level since there is no significant difference in pavement responses during those years. Three tests per mile is the minimum recommended test interval required for network level structural evaluation and also for using/updating the models developed in this study.
2. The PSE values obtained by the proposed models are recommended to be used as "suggested PSE values" along with the KDOT's recommended maximum and minimum PSE values currently in use.

The following recommendations were made by Chowdhury *(1998)*:

1.. The Bayesian regression models perform slightly better than the Classical regression models when tested on a different set of pavements and are, therefore, recommended for use for predicting PSE values.

2. The Bayesian regression is a continuous process of updating the existing "partial state of knowledge" *(Kaweski et al. 1997)*. As the existing database is enriched with more data, the Bayesian regression will result in a posterior with an even smaller confidence interval. Hence, it is highly recommended that the existing models be updated every third year with more recent data.