Implementation of Artificial Neural Network for Prediction of Pavement Structure Strains at Critical Locations

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Abstract

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1. Introduction

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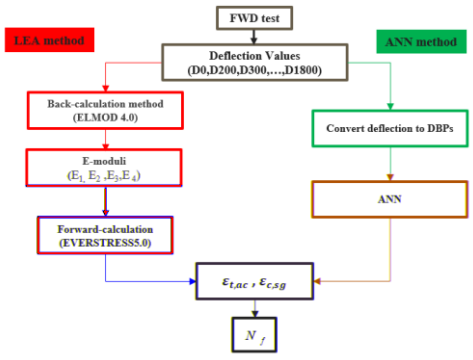


Fig. 1

2.2.1 Fatigue Cracking

$$N_f$$

$$N_f = k_1(\varepsilon_{1,\alpha})^{-k_2}(E_1)^{-k_2}$$

2.2.2 Rutting

$$N_f$$

$$N_f = k_4(\varepsilon_c)^{-k_5}$$

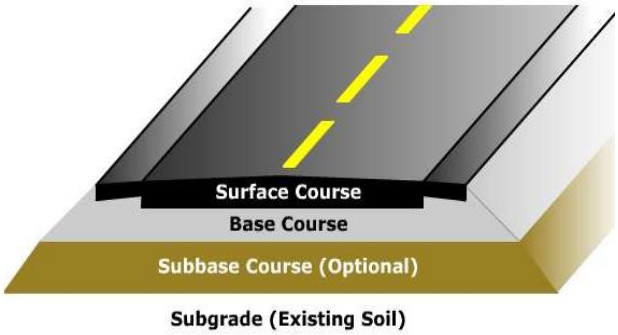


Fig. 2

2.3 Falling Weight Deflectometer (FWD)

2. Background of the Study

2.1 Typical Pavement in Thailand

2.2 Pavement Distress

2.4 Deflection basin parameters (DBPs).

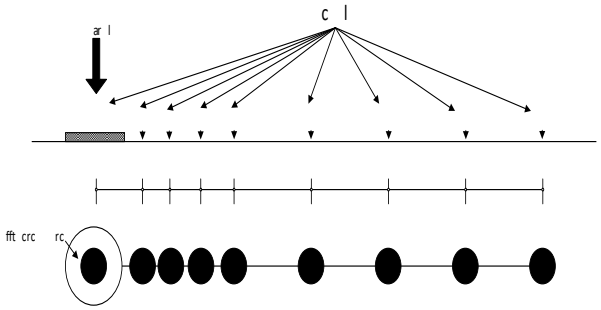


Fig. 5



Fig. 3



Fig. 4

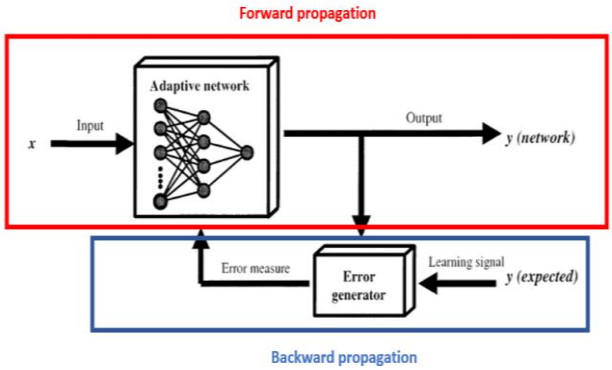


Fig. 6

3. Methodology

2.5 Artificial neural network (ANN)

3.1 Architecture of ANN

2.5.1 Forward propagation learning in ANN

3.2 Fitting network

2.5.1 Forward propagation learning in ANN

4. Results and discussion

4.1 Summary of the most relevant three DBP

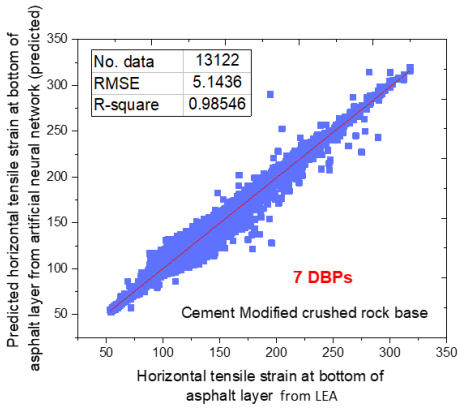
4.2 Comparison R^2 and RMSE between ANN with 7DBPs and ANN with 3DBPs of the predicted strain

Table 3

Type of pavement	Type of strain	No. of DBPs	Input

Table 4

Type of pavement	Type of strain	No. of DBPs	R^2	RMSE



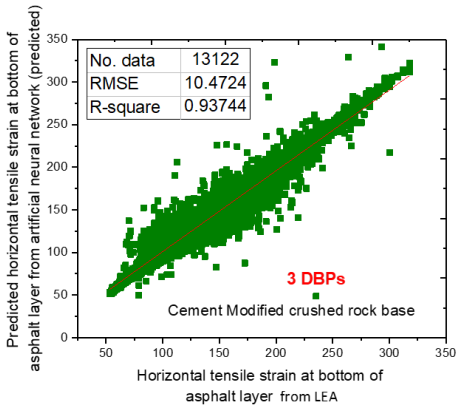


Fig. 14

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4.3 Comparison of R^2 from ANN and Wantanagun [1]

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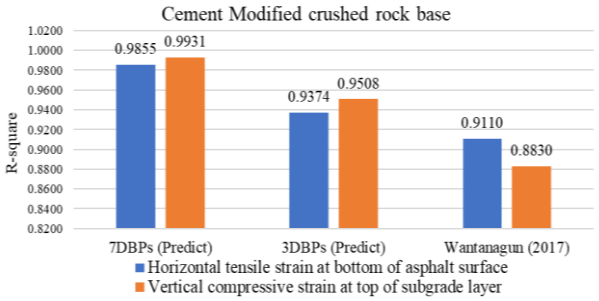


Fig. 15

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4.4 Accuracy of successfully developed ANN

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5. Conclusion

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