CHAPTER 6

CONCLUSIONS

6.1 GENERAL

The comprehensive studies carried out in the previous chapters meant to provide convincing experimental evidence and soft computing techniques to the concrete mixing strength evaluation process. Quality of concrete is accomplished by trial mixes arrived at by the use of certain established relationships among different parameters. The analysis of data already generated thereby providing a basis of judicious combination of all the ingredients involved.

Achieving this scope required intensive research about the main components (cement, fly ash, fine aggregate, bottom ash, coarse aggregate and light weight aggregates) of this thesis and its effect on the mechanical properties of concrete due to the inclusion of light weight aggregates into a concrete mixture.

6.2 EXPERIMENTAL RESULTS

The results show that 5% replacement of cement with fly ash, fine aggregate with bottom ash, and coarse aggregate with light expanded clay aggregate (LECA) was found to be good performance in compressive strength, split tensile strength, and flexural strength of beam in 56 days when compared with 28 days strength and dry weight of specimen have been reduced.

In this connection the Lytag light weight aggregate concrete even as noting the sophisticated technology in producing light weight concrete. The
results shows that 10% replacement of cement with fly ash, fine aggregate and coarse aggregate with Lytag light weight aggregate was found to be good performance in compressive strength, split tensile strength and flexural strength in 56 days strength and dry weight of specimen have been reduced.

In both types of concrete mix, deflections were measured in the left, middle and right of the beam. The deflections in all levels are gradually increased when the applied load increases.

6.3 PREDICTED RESULTS

After this evaluation process, the significant intention of the proposed technique is to frame a mathematical modeling with the aid of optimization techniques.

The theoretical results are observed through the AFSO, PSO and HS algorithm for compressive strength, split tensile strength, flexural strength and deflection in both concrete mixes by adopting the experimental values.

Mathematical modeling technique crowned with the AFSO technique which amazingly attains the accurate ideal values of the weights in model. The multivariable optimization issues ushers in the universal optimum solution and illustrates the adaptability to choose the design variables based on the weights. During the operation of the system the CS, STS and Dare assessed with the data sets. The convincing results are observed to be nearly equal to the data set minimum error value achieved in the optimization method.

All optimum results demonstrate that the attained error values between the output of the experimental values and the predicted values are closely equal to zero in the intended representation. From the results, the accuracy 95.56% on LECA replacement and 94.23% on Lytag is determined by mathematical modeling in AFSO algorithm.
This study elegantly explains the mathematical modeling technique crowned with the mighty Artificial Fish Swarm Optimization (AFSO) technique which amazingly attains the accurate ideal values of the weights in model.

6.4 CONTRIBUTION TO THE SOCIETY

In future, soft computing techniques will lead with core areas us to attain better performance in short interval of time as the time is the major factor involved in this research work. Mathematical model investigators will look towards further unbelievable improvement methodologies for the production of diminished errors with their excellent techniques for the strength evaluation in the concrete.

6.5 RECOMMENDATIONS FOR FUTURE RESEARCH

The procedure has been automated such that when new experimental sets are added to the database, the model can be updated. As the model is verified with different data sources and shows a good efficiency to predict concrete strength, it may be used as a reliable tool for assessing the design strength of concrete. The other suitable predictive tools are Artificial Neural Network (ANN) and Neuro Fuzzy Predictor (NFP) in soft computing techniques.