

## **2012/13 Undergraduate Research Grant Scheme – Executive Summary**

**Project title:**

Influence of shredded waste plastic on flexural performance of reinforced concrete beams

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University of Wolverhampton

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**Project summary:**

Most plastic are very unreactive and increasingly difficult to dispose. This report provides research showing the possibility of incorporating waste plastics as fine aggregates in reinforced concrete beams. Also, the effect of increasing the number of reinforcement bars was investigated on the flexural behaviour. Several tests were conducted in the laboratory to determine the physical and structural effect of incorporating waste plastics in concrete. Plastics replaced sand aggregates by volumes at 25%, 50% and 100% replacement. These results were compared to a control mixture. Many different data was recorded such as the workability, dry density, compressive strength and flexural behaviour. Results were plotted on graphs and were analysed by looking at different trends and patterns. Results of the data analysed showed that the dry density property was increased with an increase in replacement of plastic aggregates. However, all other properties such as workability, compressive strength and flexural behaviour worsened compared to the control mixture when there was an increase in replacement of plastic aggregates. Also, by increasing the number of reinforcement bars, the same patterns occurred as the 2 bar reinforcement as the results decreased compared to the control mixture. It was found that a high replacement of sand aggregates with plastic was not possible due to the significant decrease in the physical and structural property. However, plastic can be used at small replacements and it is important that further research is carried out using smaller volume replacements so that engineers can be confident in the data. The limitation of this research was that the plastic particles absorbed water which had an effect on results meaning that different water/cement ratios could be investigated.