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The Optimization of Consumption steel T-Shaped Concrete Beams by Genetic Algorithms

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Abstract

Optimization theory is method studies to find their optimal. The "optimal" as a technical term implies quantitative measurements and mathematical analysis, while best things are the less accuracy and more for everyday use. In this paper, by providing appropriate algorithm for the design of T-shaped concrete beams and also optimized by genetic algorithm want to get the best rate of consumption steel. In this article, the numerical results use to optimize the T-shaped concrete beams.

Keywords: genetic algorithm, optimization, T-shaped concrete beam.

1.Introduction

Genetic algorithm is one of the methods of stochastic optimization based on the concept of natural selection and genetic that inspired evolution of humans. This method uses the approximate population of possible solutions to issues offer is expressed. Genetic Algorithm produced by repeating the generation and development-focused people by the fitness function. For this purpose, the initial population consisted of people randomly and then to The development of any of the people using the fitness function evaluates and then jump on the genetic operators such as integration and has practiced And higher qualified people to form a new population creates. This will continue until the conditions of termination algorithm.

This method can be used in a wide range of issues in various fields such as engineering, mathematics, and surgery.

In this paper, by providing appropriate algorithm for the design of T-shaped concrete beams and also optimized by genetic algorithm want to get the best rate of consumption steel.

2. The method used in this paper:

1. The algorithm for the design of concrete T shape beams based on regulations Iran.

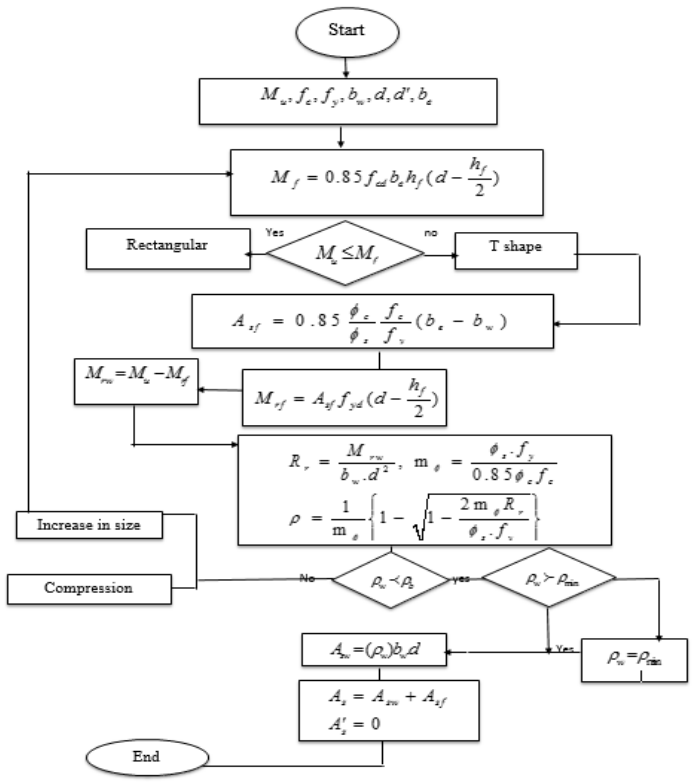

Figure 10: T shape concrete beam design algorithm

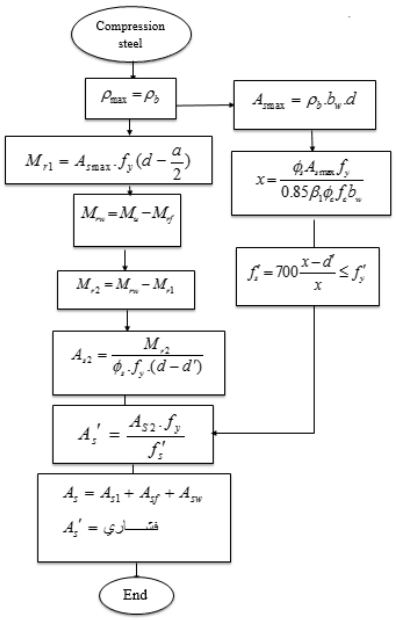

Figure 11: T shape concrete beam design with compressive bars algorithm

2. Results and Discussion

We conclude from this graph, genetic algorithms, rather than trial and error, much earlier finds the optimal level, and this issue is more with increased span length.

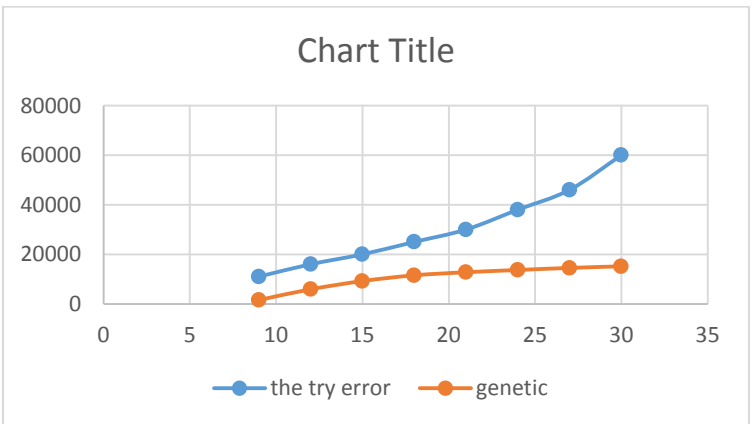

Figure 12: Genetic and the try error according to length (m)

GA was able to repeat fewer, roughly the same cost, optimizes cross section.

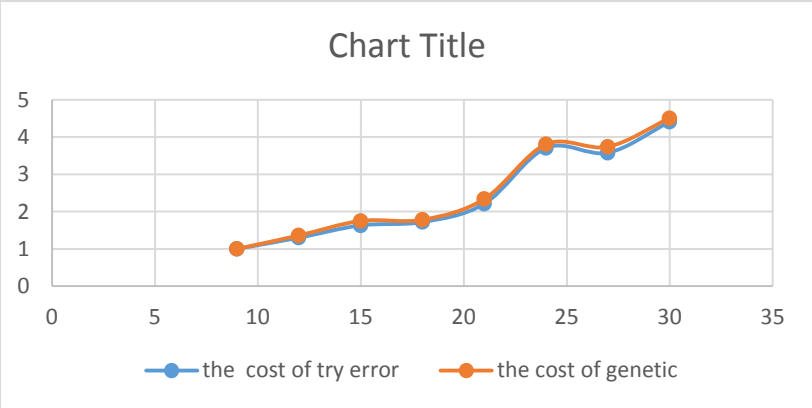

Figure 13: The cost of genetic and the try error according to length (m)

References

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