



Housing and Building
National Research Center



Housing & Building National Research Center International Conference
Future Vision & Challenges for Urban Development
"Green Smart Sustainable Building between Present & Future"
Cairo, Egypt - 15th - 17th December 2024



Ministry of Housing, Utilities
and Urban Communities



Dr./ Ashraf El Damatty

Professor and Chair
Department of Civil and Environmental Engineering
Research Director, WindEEE Research Institute
The University of Western Ontario, Canada

Lecture Title: Application of Evolutionary Optimization Methods for Intelligent Design and Retrofit of Structures

Abstract :

The evolutionary optimization methods, like the Genetic Algorithm, are very power tools that can be used to estimate the global maximum and minimum of engineering problems. They are particularly important for problems involving many local maxima and minima to sperate them from the global peak values. Dr. El Damatty and his research team have developed over the years very powerful numerical tools combining evolutionary optimization algorithms with finite element modeling (FEM) and design criteria for various applications in structural engineering. Those tools provide means for establishing intelligent design and retrofit techniques for complicated structures leading to significant savings in materials and cost. The in-house developed numerical tools have been used to design and retrofit steel conical tanks, transmission line structures, large cooling towers, long-span cable-stayed bridges, wind turbines, and double curvature long-span roofs. The challenges faced in all those applications will be highlighted in this presentation.

Field of Experience:

- Structural Optimization.
- Structural Wind Engineering.
- Earthquake Engineering.
- Fluid-Structure Interaction Problems.
- Shell Structures.