ABSTRACT

Title From Bridge to Building: Development of Steel Cable Roof Structures

Author Tara Rasheed
Advisor Theodore H.M. Prudon

In the post World War II period, the development of steel cable tension structures in architecture found sudden, and fleeting, popularity as a typology of large capacity column free spaces amenable to arena events and temporary exhibitions. Combining turn of the century advances in bridge engineering and the availability of steel and concrete in construction, during this period the influence of structural design by engineers overlapped with the desire to produce exciting new forms in architecture. Here we will look at the transition of suspension bridge technology into architecture. A selection of buildings will be explored to discuss the variations of form and structural integrity. Case studies include the American Pavilion of Expo '58 in Brussels by Edward Durell Stone, the 1959 PanAm Worldport by McCarthy Stratton, the 1964 New York State Pavilion by Philip Johnson, and Penn Station’s Madison Square Garden. While these early structures mimic traditional tent structures of central Asia, the work is executed in the most modern materials of the time. The use and behavior over time of these simple tension structures served as the basis for subsequent architectural design development and structural building methods. As a rare typology, the few that remain have become public icons and monuments reflective of local history. Adding to the variety of the built environment, the preservation and conservation of these structural monuments offers a valuable contribution to the history and development of modern architecture.