

## Niagara Falls International Airport Terminal Building

*A Vision Taking Flight: Niagara's New Gateway*

### **Situation - Innovative Application of New or Existing Techniques**

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In the Niagara Falls International Airport terminal building which serves as the gateway to the Niagara Region, the architect set out to create a structure that is truly unique with the entire structural frame exposed to view and a roof that cascaded along the length of the building representing the rapids of the Niagara River. The roof is curved as well as warped in two directions. State of the art Building Information Modeling Software was utilized to model the roof structure and to calculate the elevation of the roof steel in three dimensions.

The project required extremely close coordination between the architect, structural engineer, and later during the construction phase, contractor's fabricator for the project working with the state of the art technology to create a truly dynamic and flowing structure. Fabricator's 3D computer model for the



structure helped with an error free construction phase. Fabricator's model, depicting the connections of the various steel components of the building was recognized with a national award for computer modeling.

Niagara Frontier Transportation Authority and Stantec Consulting Group Inc. retained **Ravi Engineering & L.S., P.C.** as the Structural Engineer of Record for the design of a new Airport Terminal building at Niagara Falls International Airport.

### **Complex Analysis and Task**

The state of the art \$31.5 million passenger terminal, at 70,000 sq. ft., stands as an efficient, user-friendly facility that will serve the sophisticated needs of 21<sup>st</sup> century aviation. The creative design of the new terminal reflects the grandeur of the Niagara region, and the wonder in its care, promoting a positive gateway image.

As part of the design team for the project, Ravi Engineering &, L.S., P.C. worked with other consultants and the owner from concept through design and construction phases of the project to create a monumental gateway for the Niagara region worthy of the region's grandeur and history.

Throughout the design process, RE&LS worked diligently using the state of the art technology such as Building Information Modeling (BIM), finite element analysis and good old sound engineering judgment to convert the architectural designer's art and images of the structure into reality.

Ravi Engineering & L.S., P.C. worked tirelessly from the concept phase through the final design, converting spectacular artistic images created by the architect for the project into reality. Analysis and design of the various complex structural shapes and forms pushed the boundaries of engineering even though state of the art computer technology was utilized throughout the project.

## **Result**

Ravi Engineering & L.S., P.C.'s tireless attention to detail, careful consideration for the art of the structure and timeliness of service resulted in fulfilling the owner's dream of more than 20 years and architect's theme for the structure under budget and on time.

Niagara Falls International Airport Terminal Building is a fitting tribute to the profession of engineering and the structure advances the state of the engineer's art in the eyes of the public.

The chairman of Niagara Frontier Transportation Authority, the owner of the project, summed up his feelings and satisfaction for the project in the following words:

*"The new terminal at the Niagara Falls International Airport is worthy of the region it will now serve. With its striking design and innovative features, it is both a fitting heir to this area's aviation legacy and a testament to the foresight and perseverance of its people."*

Meeting the project budget was crucial to the success of the project. The design and construction of the terminal building was well within the budget of \$31.5 million allocated for the project. Cooperative effort between Ravi Engineering & L.S., P.C. staff, architect and contractor resulted in timely completion of the steel erection, thereby allowing the contractor to finish the project on time for the scheduled early fall opening of the terminal building.

Ravi Engineering & L.S., P.C.'s perseverance, diligence and ingenuity resulted in fulfilling all the architectural intricacies and artistic goals for the structural appearance of the exposed steel throughout the building. RE&LS's design incorporated efficient and cost effective solutions in creating large column free areas within the structure.