

## GRAITEC Advance Design Award 2022: the most innovative projects by structural engineers and design offices

October 2022- Cutting-edge software innovator Gritec, organized an international contest dedicated to structural engineers and design offices: **GRAITEC Advance Design Award**.

This award recognizes the most practical uses of Advance Design in steel, wood and concrete design projects. The competition is open to Advance Design users and students who wish to showcase their experience and technical knowledge through an Advance Design project.

50 projects selected from a large list from 13 countries were evaluated by a prestigious professional jury. The winners of the second edition of the competition were invited to the new Gritec headquarters in Paris to receive their prizes.

Winners of the **Customer Category**:

1<sup>st</sup> place – Yassine Talmi – OTEIS – France – [“Ilot Pasteur –”](#) Monaco

This prestigious project for a prestigious customer, “Principauté de Monaco,” is based at the West entrance of Monaco near the “Jardin Exotiques” with a global budget of 320M€. The project is quite complex from a technical point of view due to several constraints: the surrounding existing structure, the way the project is done and the BIM collaboration between the stakeholders. The size of the project is around 250m by 45m. It is surrounded by existing construction (as construction lands are expensive in that area), with a strong need to avoid any damage to those existing buildings during the construction phase. The building is erected with an innovative and unusual approach, from upper levels to those underground. To achieve the goals and successfully manage the project, architects and engineers have designed it using complete BIM processes at each step. The BIM interoperability between Revit and Advance Design have been key for the success of such a project, enabling effective data exchanges and helping to comply with strict deadlines.



2<sup>nd</sup> place – Claudio Giancane - SETI ENGINEERING – Italy – [“THE "CIOLO" BRIDGE”](#)

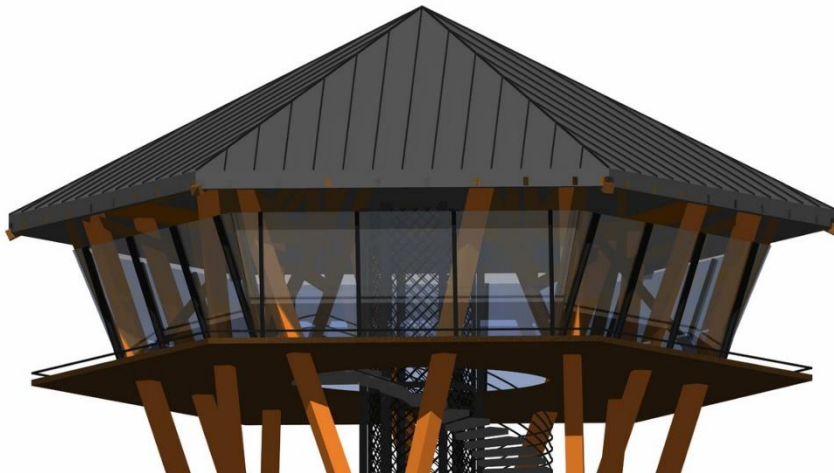
The “Ciolo” Bridge project is a retrofitting and consolidation project of an historical bridge located in Puglia (South of Italy). The arched bridge, completely made with cast-in-place reinforced concrete, was modeled in Advance Design starting from the DXF file created with AutoCAD. The preliminary study concerned the structural check of the existing bridge, discretized with finite elements ("shell" and "beam" type). Various interventions conducted on the bridge, from its construction until today, were taken into account. After identifying various criticalities, the new FEM model has been conceived considering the design forecasts of seismic and structural adaptation. The automatic generation of mobile traffic loads, as per NTC2018 regulation, available in Advance Design, was used to quickly model the loads.



3<sup>rd</sup> place – Piotr Bilo – Projektowanie budowlane i inżynierskie Robert Czach – [„WIEŻA WIDOKOWA NA SZCZYCIE GÓRY "KICZERA" – Poland](#)

This project is an hourglass-shaped viewing tower (one-sheet hyperboloid) 34.0m in height. It is designed on the plan of a regular hexagon with each side approximately 7.0m and a global building area of 126,75m<sup>2</sup>. The difficulty of this project is more on the complexity of the geometry, rather than the size of the construction itself. Each terrace is a rigid disc stabilized by inclined timber columns. The uppermost terrace is roofed (wooden roof truss) and covered with glass panels, which requires strict control of the total displacement. The roof truss is composed of six lattice girders resting on timber beams crowning the main columns and a steel shaft. Between the girders, rafters are spaced 80cm apart. Wind effects are important in such a high and flexible structure: the climatic load generator in Advance Design was used to automatically generate wind and snow loads on the structure. All timber, steel and reinforced concrete verifications were performed in one single model using Advance Design.

The geometry of the main columns has been changed by the architect, due to technical constraints to position the elevator, and the customer was able to automatically update the results and the final model in just one click in Advance Design – an important savings of time.



**Special Jury Prize for the best use of Advance Design in a BIM workflow:**

Matthias Carrière - Atelier Masse – France - [“Métamorphose – Angers ”](#)

The “Métamorphose” project is a multi-program building with a complex morphology, having reinforced concrete framework with numerous load transfer levels. The dimensions of the building are 120 meters by 80 meters, with a maximum height of 37 meters. The generalized infrastructure on the plot is mono-block, while the project is divided into five self-stabilizing subsets in the superstructure. The project is in a seismic zone, which makes the general analysis of the behavior of the structure essential. Thanks to its powerful FEM engine, Advance Design was the right tool to run the dynamic analysis and check the behavior of this complex structure under seismic loads.

To speed up the modelling of the complex geometry, the model has been exported from Revit to Advance Design, where the climatic load generator was used to generate wind loads automatically. The efficient data exchange between Revit and Advance Design allowed structural engineers to perform a quick and reliable modelling based on the work done in Revit.



#### **Outstanding performance prize:**

Sawssan Derrou – [Bâtiment de chirurgie ambulatoire et de consultations](#) - VINCI, France

The building extends over 8000 m<sup>2</sup>, divided into four levels with a central patio providing maximum natural light.

The facades of the last two levels are cantilevered and recovered by large console beams, which is a structural challenge. A steel frame is linked to the concrete structure with a dilatation joint splitting the building due to its dimensions.

As the project is in seismic zone 2, a seismic analysis of the project was carried out with Advance Design, taking into account the elastic stiffnesses for the pile modelling.

The modelling has been done using two GRAITEC products. A first reinforced concrete model has been created using Arche Ossature to get a first estimation of the gravity loads distribution and the presizing of the sections.

Then, the Arche Ossature model was exported to Advance Design and completed with the steel structure imported from an IFC file. The Open BIM compatibility of Advance Design was a key contributor on this project.

After completing the geometry, all types of loads, statics and dynamics were introduced in Advance Design using automatic tools. The flexibility of modelling more than one type of material in one model was a crucial feature for the design of this project.



**Winners of the student category:**

1<sup>st</sup> place - Adel Sfeir – Lebanese University – Faculty of Engineering - "[Aviation Service Steel Hangar in Addition to a Concrete Service Building](#)"

2<sup>nd</sup> place - Georges Rkaiby – ISSAE Cnam Liban (centre associé au Cnam Paris) – "[Structural and seismic analysis of a 12-storey residential building using modal analysis and push over methods.](#)"

Mr. Francis Guillemard, president and founder of Graitex and president of the jury, said of the Advance Design Award: *"It is always a tough job to have the responsibility to choose the winners in a contest with high quality projects, especially if they come from all corners of the world from a grand variety of structures. Acknowledging this makes the jury so crucial.*

*The award is gathering brilliant structural engineers and benchmark projects ... and of course excellent FEM software! It is the magic recipe of success. We had lengthy deliberation in the jury because it was hard to choose winners. In fact, each project deserves a prize, but in the end, we had to choose the winners, and we did."*



#### **About GRAITEC:**

#### **MODELING THE FUTURE SINCE 1986**

We are BIM and modeling experts dedicated to empowering construction and manufacturing professionals to digitize and industrialize their processes to improve performance and build a sustainable tomorrow.

#### **Our metrics:**

**270 000 users** - GRAITEC is customer obsessed and active in 14 countries: as a VAR and as a leading BIM applications developer and expert.

**\$300 million in revenue** - Thanks to its organic growth and to numerous acquisitions in Europe and North America, Graitec is experiencing exponential international growth.

**700 experts worldwide** - With more than 300 BIM consultants and 100 new hires in 2021.

[www.graitec-group.com/](http://www.graitec-group.com/)

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