



Introduction to the project

This small composite structure of steel and concrete is part of a larger concept that includes two tennis courts set amid a beautiful landscape full of trees and plants. The tennis courts were designed according to international rules and specifications. The building will accommodate a small café and the locker room for the tennis players. It was designed with the provision for a roof garden in the future.

Description of the project

The main structure was designed with steel members and concrete slabs.

The composite beam module was used in order to design the secondary beams to reduce the weight of these members.

Approach

The distances between the columns of each frame were about 5.80 m. The distances between the frames were set at 3.90 m. The dimensions of the building were 10.25 m x 5.80 m and the height was approximately 3.50 m. We used HEA260 for the columns, IPE300 for the main beams, IPE220 and IPE100 for the secondary beams and an SHS cross-section for the roof bracing. To simulate the diaphragm of the slab, HEA1000 for the roof bracing was used, without weight and mass, using property modifiers.

The use of Scia Engineer in this project

We designed the 3D model, using the Line Grid option. The next step was to make all the load cases, load groups and load combinations.

Load groups:

1. G : permanent
2. S : snow
3. W : wind
4. E : seismic
5. Q : variable
6. T : temperature

Load cases:

1. LC1 : self-weight
2. LC2 : permanent
3. LC3 : variable
4. LC4 : snow
5. LC5 : seismic X
6. LC6 : seismic Y
7. LC7 : thermal +
8. LC8 : thermal -
9. LC9 - LC24 : 3D Wind Load Cases

Load combinations:

1. EN-ULS
2. EN-SLS
3. EN-seismic X
4. EN-seismic Y

For the wind loads we used the 3D wind option to calculate with accuracy all the zones according to EN1991-1-4.

For the permanent and the snow loads we used line forces on beams.

We used thermal loads (+/-20 degrees) for columns and the round beams. These members will be outside the building.

The seismic design followed EN1998.

After the linear and the modal analysis, we conducted section and unity checks for all the members. We also proceeded to a serviceability check for the main beams.

TE, Consulting Engineer

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CONSULTING ENGINEER

TE, Consulting Engineer was founded in 2007 to provide the following civil engineering services:

- Technical advice for the development of new buildings.
- Technical advice for the restoration/upgrading of existing buildings.
- Structural design of new buildings (concrete, steel, composite, timber and masonry structures).
- Structural design and assessment of existing buildings.
- Supervision of civil engineering works.

Due to our experience and our knowledge, we can accomplish even the most exacting projects.

TE, Consulting Engineer has managed over 60 projects in Greece.

Project information

Owner	M. Thymianou & SIA
Architect	Tsolakis Eleftherios
General Contractor	Morfometal
Engineering Office	TE, Consulting Engineer
Location	Crete, Greece
Construction Period	08/2011 to 09/2011

Short description | Sports Club with Two Tennis Courts

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