



Introduction to the project

This project includes the extension of an existing industrial baking plant founded in 2004 in Chania, the second largest city of Crete.

The existing part of the plant is a two-floor building with a basement, made from reinforced concrete.

The extension includes a two-floor composite structure of steel and concrete. The total area of the plant is about 1,600 sqm. This year we are designing a new extension, of about 200 sqm.

Description of the project

The whole structure comprises of three separate buildings. The existing building is made from reinforced concrete and the extension is made from steel and concrete. Due to the geometry of the extension, we decided to design it as two separate buildings matched together with a seismic joint.

Approach

Extension Part A

The distances between the columns of each frame are from 3 m to 6 m. The distances between the frames are from 4 m to 6 m. The dimensions of the building are 28 m x 13 m and the height about 7.50 m. We used HEA for the columns, IPE for the main and secondary beams and an SHS cross-section for the roof bracing.

Extension Part B

The distance between the columns of each frame is about 6 m. The distances between the frames are about 3 m. The dimensions of the building are 15 m x 6 m and the height is about 7.50 m. We used HEA for the columns, IPE for the main and secondary beams and an SHS cross-section for the roof bracing.

For both parts of the extension, the secondary beams were designed using the composite beam module in order to reduce the total weight of steel.

To simulate the diaphragm of the concrete slab, HEA1000 was used for the roof bracing, 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

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 - LC22 : 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 loads and snow, we used line forces on beams. 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

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|---------------------|---|
| Owner | M. Koundouraki |
| Architect | Konstantina Lakiotaki, Tsolakis Eleftherios |
| General Contractor | Morfometal |
| Engineering Office | TE, Consulting Engineer |
| Location | Crete, Greece |
| Construction Period | 12/2011 to 03/2013 |

Short description | **Extension of Two-Floor Industrial Baking Plant**

This project includes the extension of an existing industrial baking plant that was founded in 2004 in Chania, the second largest city of Crete. The plant produces many different products using the best-quality raw materials. Specifically, it produces different types of pies for a traditional snack, called "souvlaki".

The existing part of the plant is a two-floor building with a basement, made from reinforced concrete. The extension includes a two-floor composite structure of steel and concrete. The total area of the plant is about 1,600 sqm. This year, we are designing a new extension, of about 200 sqm.

