

Precast system for industrial buildings

ONDAL®





INDUSTRIAL ROOFING

- ONDAL® is the most advanced roofing system for industrial use patented with the signature Dal Lago
- It is estimated that since 1988 more than 16 million m² of ONDAL® buildings have been built among Europe, Latin America and Africa
- Dry connections for fast assemblage



- The system has a low m³ of concrete over m² of building ratio

Industrial roof systems are the pride of Italian prefabrication in the world. ONDAL® is the last and most advanced precast system for industrial use patented under the surname Dal Lago. The previous are the Dalla, Urano, Titano, Nike, Pitti and Star systems.

The system has been patented and launched on the market in 1988 and since then it has been subject to a constant evolution up to the patent of 2012 (ONDAL 12®), characterised by several functional innovations. The product has been getting a foothold at international level due to its performance. It is estimated that more than 16 million square metres of precast buildings have been made with the ONDAL® system from 1989 mainly in Italy, France and Spain, but also in Latin America and Northern Africa.

The ONDAL® system allows the construction of large structures completely precast with wing-shaped pre-stressed slab members distanced by shells, pre-stressed beams, columns and foundation footings in reinforced concrete. It is clad with precast concrete panels. Dry mechanical connections are used, allowing for a high speed assemblage.

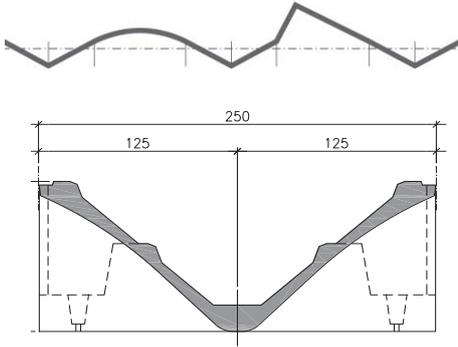
The structural optimisation of the system brought to the attainment of an average m³ of concrete over m² of the building ratio as low as 0,12. Lightness, architectural appeal and economy are among the factors that allowed its success.

The ONDAL 12® system is based on three technological solutions based on the maximum bay achievable:

- ONDAL standard: 12 x 30 m
- BigONDAL: 12 x 42 m
- ONDAL Strallo: 75 x 30 m



Original trademark of 1988



ONDAL SLAB MEMBER

The ONDAL slab member is a wing-shaped member with average thickness of 7 cm and subsequent high lightness. It is produced in the depth of 70, 100, 120 and 150 cm and they are mounted at an inter-axis of 6 m interposing between slab and slab shell elements.

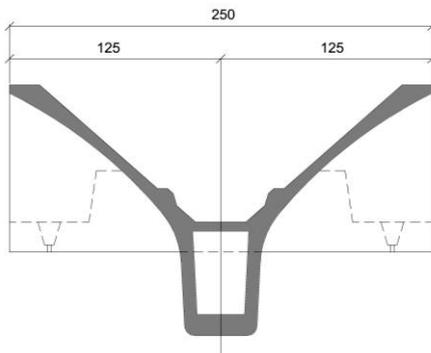
His reduced weight allows to cover long spans:

- up to 21 m for a depth of 70 cm
- up to 30 m for a depth of 100 cm

- Lightness

- Long span

- BigONDAL for longer span



For longer spans, a closed core lightened element named BigONDAL is been engineered. The maximum spans achievable are:

- up to 36 m for a depth of 120 cm
- up to 42 m for a depth of 150 cm

- High fire resistance

Despite the low thickness, the position of the pre-stressing tendons provides a high fire resistance of all roof members.

LEGEND

- 1) Foundation footing
- 2) Column with corbels
- 3) Crane beam TT
- 4) Roof beam I
- 5) ONDAL slab member
- 6) Terminal element
- 7) Shed shell
- 8) Barrel-vault shell
- 9) Barrel-vault shell with skylights
- 10) Edge adjustable shell
- 11) Cladding panel









Shells

The clear spacing of 3,5 m left between ONDAL elements mounted at an inter-axis of 6 m is covered by shells of the following types:

- Shed or barrel-vault shaped
- The elements can provide a high zenital enlightenment
- Continuous thermal insulation allows high energetic performance
- Compatible with the installation of photovoltaic panels
- Natural ventilation lowers the summer thermal load
- The system of regulating air change also provides smoke expulsion in case of fire

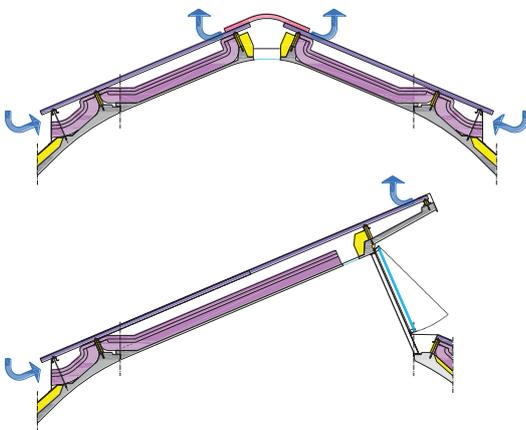
- shed concrete shells
- blind or skylight barrel-vault concrete shells
- barrel-vault bent steel corrugated sheet

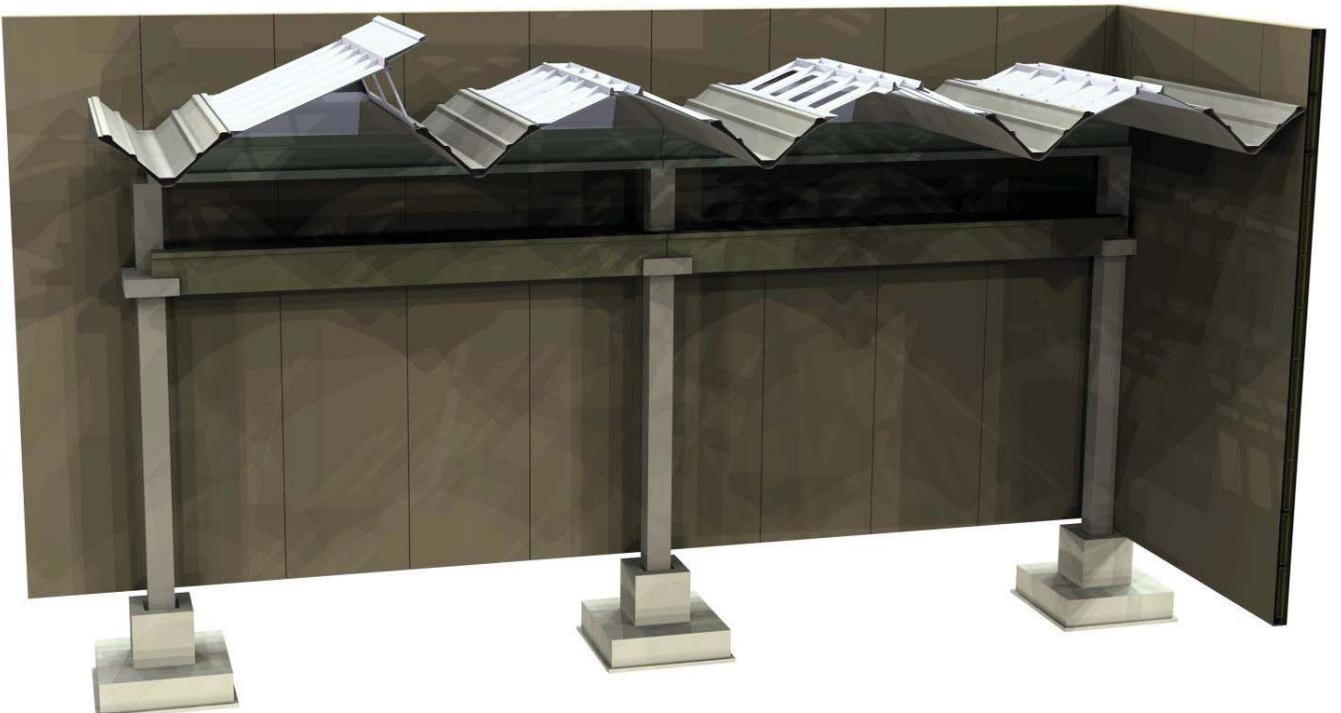
used singularly or in combination. Metallic sheet, ventilation chamber and thermal insulation are placed on top of the grid concrete shells, making a ventilated roof.

Shed elements are compatible with the installation of photovoltaic panels.

All ONDAL 12® elements are energetically optimised to have high thermal performance both for heating with the elimination of thermal bridges and for cooling with natural ventilation.

The shells are provided with air valves that ensure the remotely controlled air change of the environment and that automatically enter in function in case of fire, expelling smoke.







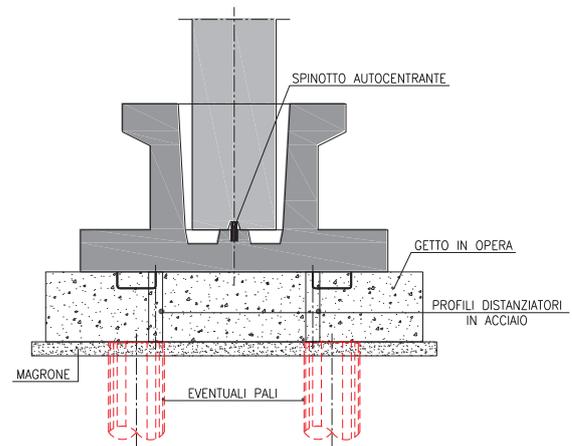
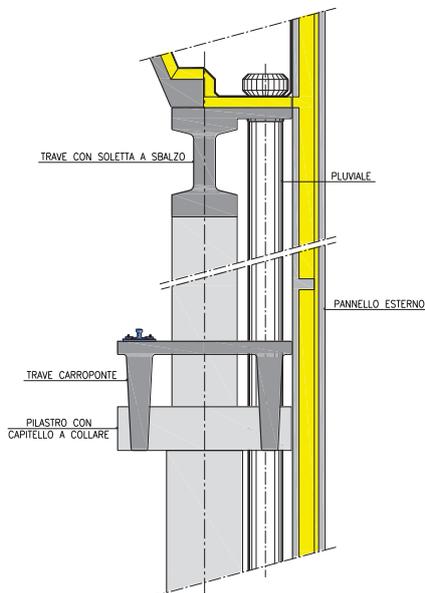
Beam, column and foundation elements

- Roof beams have I cross-section
- Columns have rectangular section
- Integrated waste system of rain water

The pre-stressed beams that support the ONDAL roof elements generally have I cross-sectional shape. Cranes are installed on TT pre-stressed beams.

The beams are installed and connected on top of rectangular or square cross-section columns with corbels.

The rain water is taken down to waste through ducts that can be inside the cross section of the columns or can run externally.





ONDAL Strallo

The Strallo has been engineered to cover bays of up to 30 x 75 m.

- For exceptional span

The ONDAL Strallo system can be employed to build exceptional span structures such as hangars of exposition pavilions.

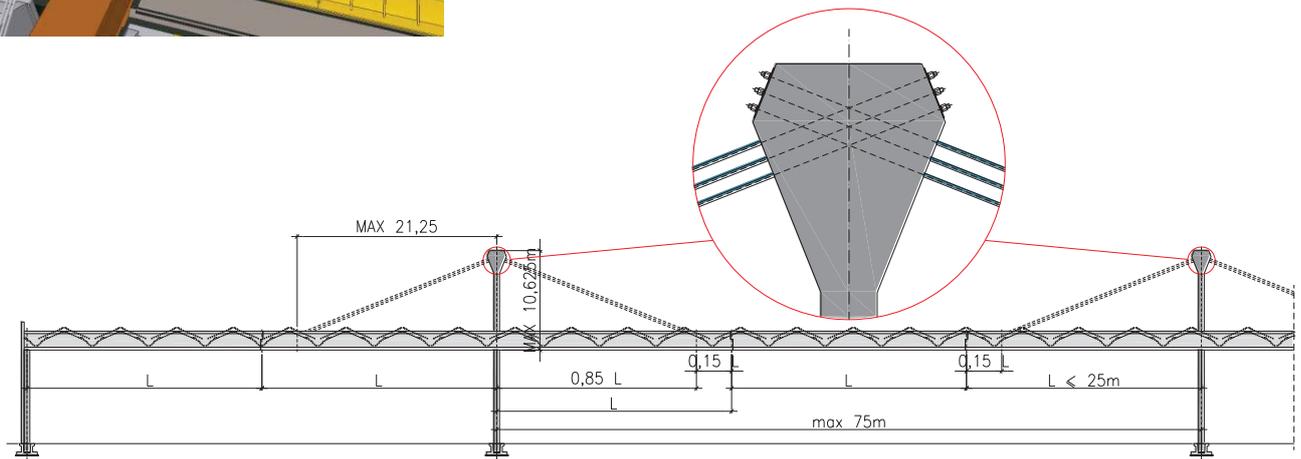
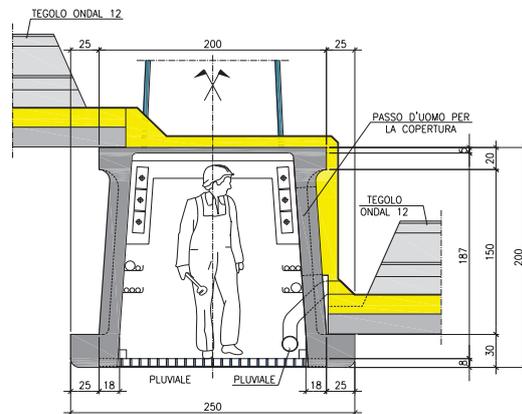
- Omega shaped deep beam hosting a catwalk

The beam element has an omega shaped cross-section and hosts inside it an accessible catwalk where also equipment can be distributed. The ONDAL standard elements are supported on this beam.

- High formal value with pylons and cables

The beam is supported at the edges on top of pylon corbels and along its span by steel cables that are anchored in the pylon top bulbs.

The high pylons are only placed in the inner bays, whilst the perimeter of the building is made with standard modular frames.





Cladding panel

The cladding panels, placed vertically or horizontally, are made with reinforced concrete with continuous thermal insulation placed in between the inner grid screed and the outer suspended screed.

In between the two concrete layers a natural ventilation chamber can be left.

The panels and their connections are energetically optimised so to get a total envelope transmittance U down to $0,2 \text{ W/m}^2\text{K}$.

Several finishes techniques can be mechanically applied to the outer surface of the panels, also in combination, among which:

- Double screed panels with continuous thermal insulation
- A natural ventilation chamber can be left
- High energetic performances with low transmittance
- Multiple dry finishes techniques for different aesthetic solutions

- bush-hammering
- polishing
- washing
- matrix patterns





OUR REFERENCES

Producers of the ONDAL® system	Location
Italy	
Antonio Basso prefabbricati	Treviso (TV)
Manini prefabbricati	Assisi (PG)
MC prefabbricati	Cardano al Campo (VA)
MC-Manini prefabbricati	Somaglia (LO)
Sicep	Belpasso (CT)
Truzzi prefabbricati	Poggio Rusco (MN)
France	
Eurobeton	St Siméon de Bressieux (Lyon)
Spain	
PRAINSA	Zaragoza

more details? design quotations?

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