INDUSTRIAL WORKS IN ZOLA PREDOSA

NEW INSULATION AND WATERPROOFING USING MAPEPLAN SYNTHETIC MEMBRANE IN A MANUFACTURING FACILITY IN CENTRAL ITALY

Repair works on the roof of an industrial facility in Zola Predosa (Central Italy) were particularly complex. Although the condition of the roof was critical before the work began, the solution adopted, MAPEPLAN T M synthetic waterproofing membrane, proved to be highly effective and functional, allowing the roof to be repaired in complete safety.

The roof needed to be repaired because of two main problems:

• during the winter, when the outside temperature drops to below 0 °C, condensation would form on the ceiling in the production areas and water would drip into the areas below;

• when there was long, heavy rainfall or heavy snow, water would leak into the building around the guttering inside the building.

The client and designer decided that the repair work should eliminate the condensation and water seepage in order to guarantee that production could continue uninterrupted and in complete safety, as well as to reduce the amount of electrical energy and gas required to keep the facility warm in winter and cool in summer.

The specific aim of the work was to completely eliminate the formation of condensation in the following conditions:

• external temperature +28 °C with 65% R.H.

• external temperature -10 °C with 95% R.H.

The shape of the roof itself presented another problem because the structure is in precast reinforced concrete members and is made up of a series of covering elements for roof with special wing-shape, connectors between the beams and a saw-tooth pitched sheds.

The old insulation and waterproofing systems were inadequate for the local weather conditions. Apart from the insulation being too light for these conditions, the situation was made worse by the numerous construction joints in the system that formed thermal bridges.

OVERCOMING THE PROBLEMS WITH THE MAPEPLAN T M SYSTEM

A preliminary, in-depth survey was carried out with the waterproofing contractor to assess the condition of the roof, and a series of samples were taken from various parts of the roof to identify the origin of the problems so as to eliminate them once and for all.

The survey showed that the condensation was caused by the following reasons:

• insufficient thermal insulation;

• the lack of an efficient vapour barrier layer;

• thermal bridges at the interface between the covering elements and the beam connectors.

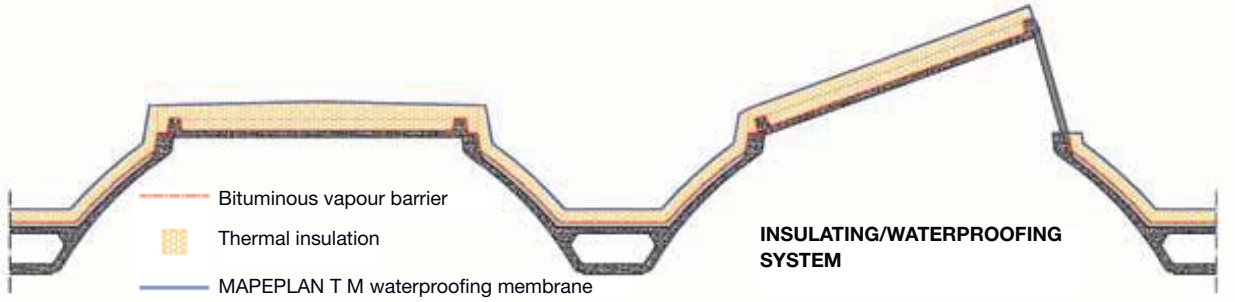
When the manufacturing facility was built in 2008, this type of structure was widely used for industrial buildings and warehouses in Italy without caring too much about the heating system or comfortable working conditions. The thickness of the insulating material was minimal and a proper vapour barrier was not included in the system.

The mineral bituminous waterproofing membrane was left in place on the covering elements so that it could act as a vapour barrier for the new roofing. New 130 mm thick EPS 150 kPa insulating panels were anchored to the substrate with mechanical fastening.

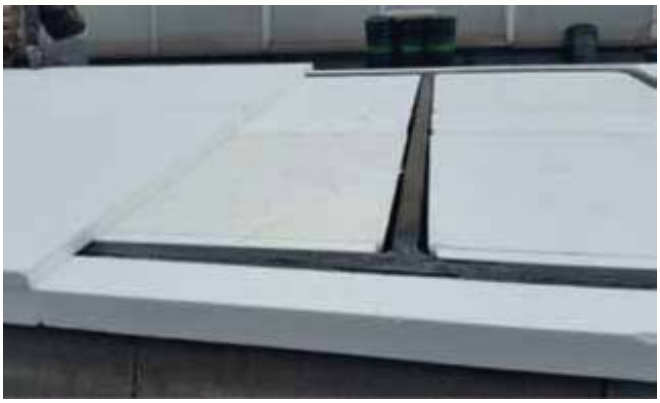
Over the insulating panels, MAPEPLAN T M FPO (flexible polyolefin) waterproofing membrane was then applied and left exposed, which was also anchored to the substrate using a mechanical fastening system.

The old wooden elements and mineral fibre insulation on the covering beam connectors and fibre-cement saw-tooth pitched roofs were removed and disposed of at an authorised waste disposal site, in line with the current legislation.

A new POLYVAP RADONSHIELD bituminous membrane reinforced with aluminium strip was then applied, which acted as a vapour barrier and temporary waterproofing layer while the old system was removed. All work was carried out with the utmost care to make sure there was a water-tight seal between the new waterproofing and the old bitumen membrane and a constant air-tight and vapour-tight seal at the interfaces between the beams, connectors and saw-



APPLICATION OF POLYVAP RADONSHIELD VAPOUR BARRIER



APPLICATION OF EPS INSULATING PANELS

tooth roof.
New 175 mm thick EPS 150 kPa insulating panels were installed over the connectors and saw-tooth roof. Double layers were applied in these areas; the first layer was used to fill the areas between the ribs for the beam connectors and saw-tooth roof, the second layer to form a continuous cover over the connectors and saw-tooth roof and to eliminate any thermal bridges at the beam/connector/roof interfaces. Both layers of panels were anchored to the substrate with a mechanical fastening system. In this case, MAPEPLAN T M FPO waterproofing membrane was applied over the insulating panels.
MAPEPLAN T M waterproofing membrane applied over the beams and saw-tooth roof was overlapped and heat-welded to the MAPEPLAN T M membrane applied on the beams, thereby forming a perfectly water-tight waterproofing layer and transforming the roofing into a "continuous" solution. The size and pitch of the mechanical fastening used to anchor the new system were calculated according to the specified conditions acting on the roof and according to the guidelines in Eurocode 1-4 and current applicable standards, taking into account the calculated wind uplift and the application of an adequate safety factor.

EFFECTIVENESS OF THE INTERVENTION

To sum up, the special characteristics and advantages of the solution adopted using MAPEPLAN T M were:
- continuous, functional vapour barrier (eliminates condensation)
• significant increase in thermal insulation capacity (eliminates condensation and reduces energy consumption);
• elimination of thermal bridges (eliminates condensation);
• "continuous" heat-welded waterproofing system (eliminates leaks and infiltrations);
• "cool roof" waterproofing system with a high "Solar Reflectance Index" (to reduce energy consumption in hot weather);
• highly functional, highly durable insulating/waterproofing system;
• rationalised application sequence and schedule that prevented the risk of accidental leaks and seepage during installation and allowed production activities to continue while work was carried out.

Mauro Redemagni. Poyglass SpA (Italy)

THE ROOF AFTER COMPLETION OF THE WORKS

TECHNICAL DATA
Industrial works, Zola Predosa (Bologna, Italy)
Year of Construction: 2008
Year of Polyglass' (Mapei Group) Intervention: 2015
Intervention by Polyglass: supplying products to waterproof the roof
Designer: Politecnica Ingegneria e Architettura
Main Contractors: MS Isolamenti SpA, Sforazzini Srl
Polyglass Co-ordinator: Mauro Redemagni, Polyglass SpA (Italy)

POLYGLASS PRODUCTS
Idroprimer, Polyvap Radonshield, Mapeplan T M

For further information on Polyglass products see www.polyglass.com