Anti-Static & Super Hydrophilic Self -Cleaning Coat

Anti-fouling Coat Case Study

Exterior material / window glass / solar panel

Super Glass Barrier

Super Glass Barrier

Clean Self Coat CNT

Solar Self Maintenance Coat CNT

YouTube

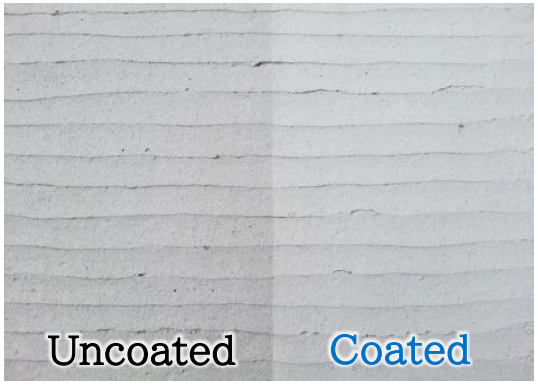
To Nature, Earth & Humans ECO Sketch

Sketch BM Sketch Business Management

Antifouling effect and color difference of the Super Glass Barrier

Antifouling effect in exterior materials

◆ 2 years after coating on the JOLYPATE



◆ 2 years after coating on the painted wall

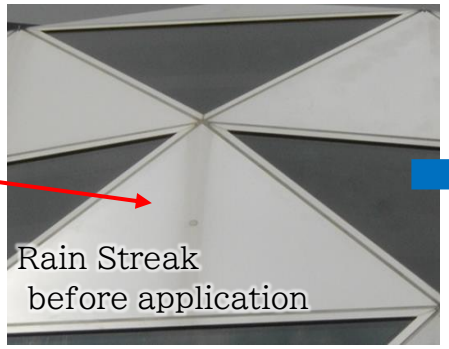
Coating application example for Volcanic Ash Protection

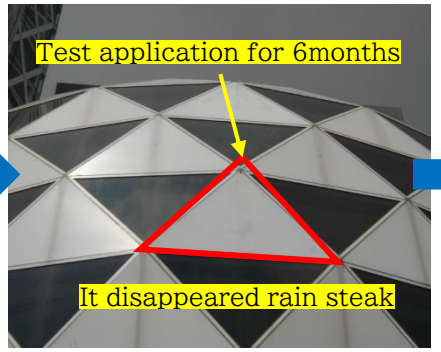
◆An antifouling coat is applied over the heat-reflective paint on the roof of the Kagoshima Aquarium in Japan, and a comparison is made with an uncoated area.

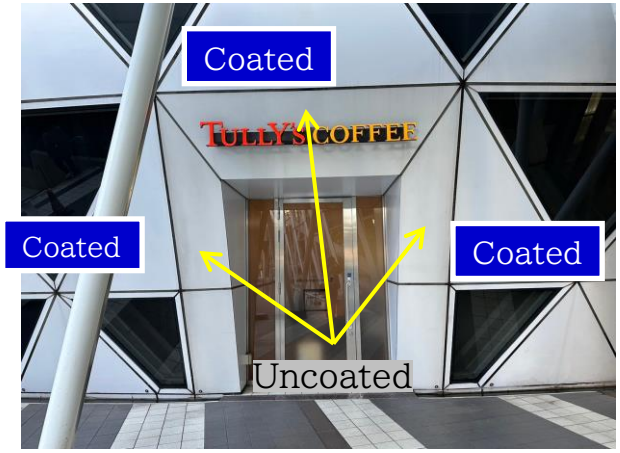
Areas where the anti-fouling coating has not been applied over the paint are gradually becoming blackened by volcanic ash and dirt each year. In contrast, the areas with the coating show significantly less dirt adhesion, effectively preventing the decrease in reflectivity of the heat-insulating paint.

Coating application example for Rain Streak Prevention

◆ Antifouling effect was confirmed even after 10 years after applying an antifouling coating to the exterior panels of a building in Shinjuku Station, Tokyo.



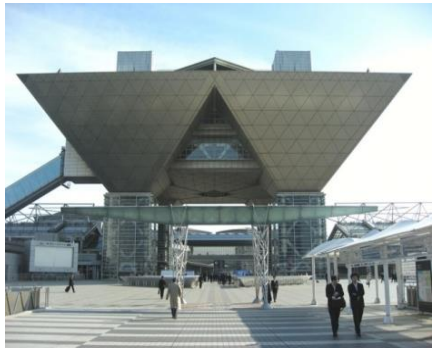


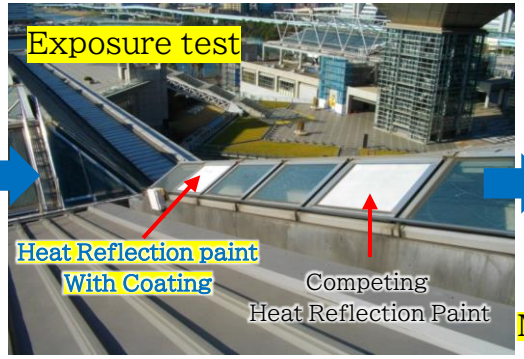


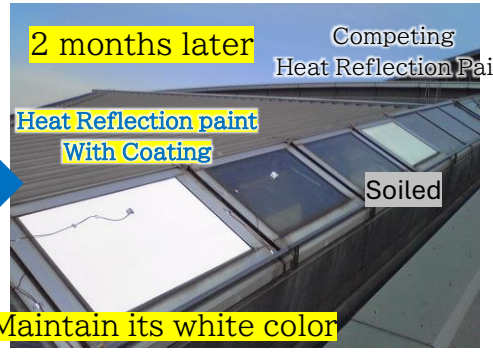
One year after the anti-fouling coating was applied, it was demonstrated that the exterior wall panels of a store that moved into the tenant space had not been treated with the anti-fouling coat, making dirt and stains noticeably visible.

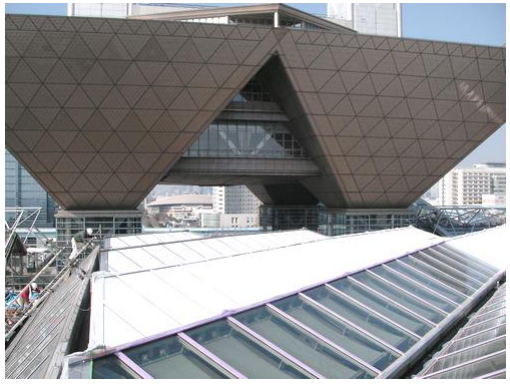
Coating application example
for Reflectivity and Aesthetic Maintenance Measures for Heat-Reflective Paint

◆ To address the issue of excessive glare from the skylight glass on the roof of the West Hall at Tokyo Big Sight, heat-reflective paint was applied to the glass, followed by an anti-soiling coating. The project was carried out as a measure to reduce glare, enhance heat insulation, and maintain aesthetic appeal.









It was officially adopted, and 2,000 square meters were applied in 2009.

Prior to the project, an exposure test was conducted comparing our heat-reflective paint with that of other companies. The areas coated with our paint and anti-fouling coating maintained their white color even after two months, while the competitor's coating showed gray discoloration on the surface due to dirt, resulting in inferior infrared reflectivity and aesthetic retention.
As a result, our heat-reflective paint with an anti-fouling coating was selected, leading to an order for 2,000 square meters.

Coating application example

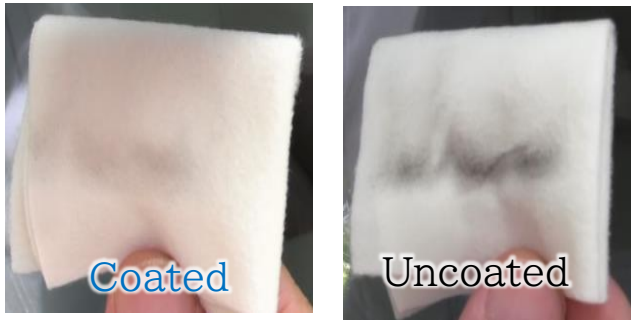
Cost Reduction Measures for Regular Maintenance and Cleaning of Window Glass

◆A certain airport in Japan: Passed the 10-month outdoor exposure test of window glass.

Challenge to Reduce Maintenance Frequency and Lower Costs

The current cleaning maintenance cost for exterior window glass is ¥210 million annually, with three cleanings per year (¥70 million per cleaning). The plan aims to reduce the frequency to twice a year, lowering the annual cost to ¥140 million and achieving an annual maintenance cost reduction of ¥70 million.

◆Verification After 10 Months



Checking Dirt Adhesion Through Wiping
= Verification of Anti-Static Effect

Spray Water
= Verification of Super Hydrophilic Effect

It was proven that the anti-static effect and super-hydrophilic properties were maintained even 10 months after applying the anti-soiling coating to the exterior window glass.

Coating application example for Reflectivity and Aesthetic Maintenance Measures for Heat-Reflective Paint

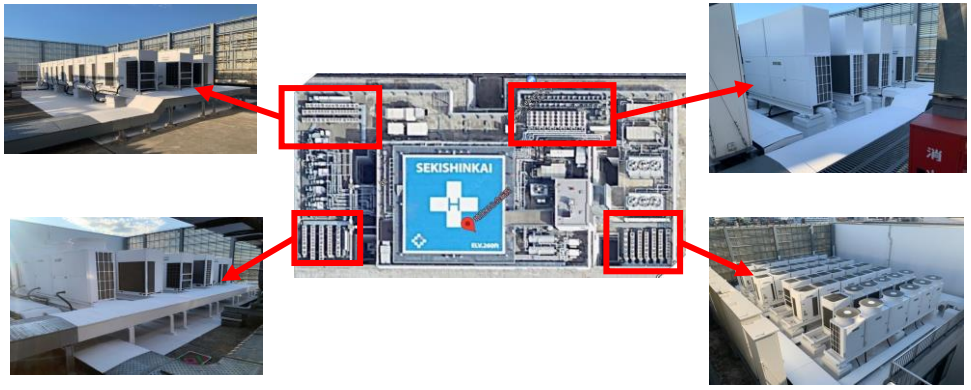
◆Heat-Reflective, Thermal-Insulating, Anti-Corrosion, and Anti-fouling Coating for Rooftop Outdoor Units of Drugstore Locations: 150 Stores or more × 300 sqm (More than 45000sqm) since 2020






◆Heat-Reflective, Thermal-Insulating, Anti-Corrosion, and Anti-Soiling Coating for Rooftop Outdoor Units and Surrounding Areas of Hospitals

1586 sqm Applied at a Hospital in Saitama, 2022



538.88 sqm Applied at a Hospital in Tokyo, 2022



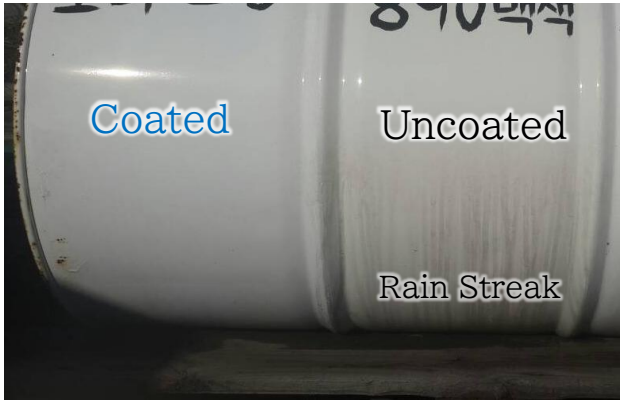

Over-sea's Coating application example in South Korea

◆ Anti-fouling Test on White Paint Conducted at JB paint in South Korea
(the 3rd Largest Manufacturer in the Paint Industry)

Applied Super Glass Barrier to Half the Surface (November 2013)

Set Up Outside

4 Months Later (March 2014)



1 Year and 2 Months Later (January 2015)

Over-sea's Coating application example in China, Hongkong

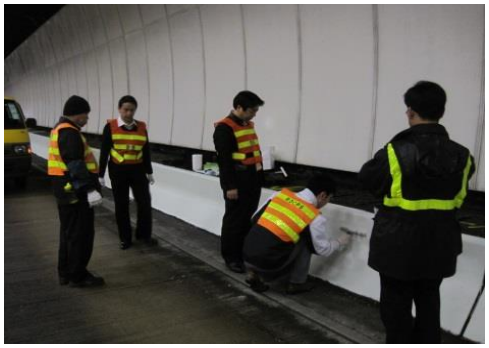
◆ Tianjin International Cruise Terminal for exterior concrete

Coating Area 43,000 sqm

◆Nanjing Youth Olympic Center / Application to Exterior Fiberglass Concrete Coating Area 100,000sqm

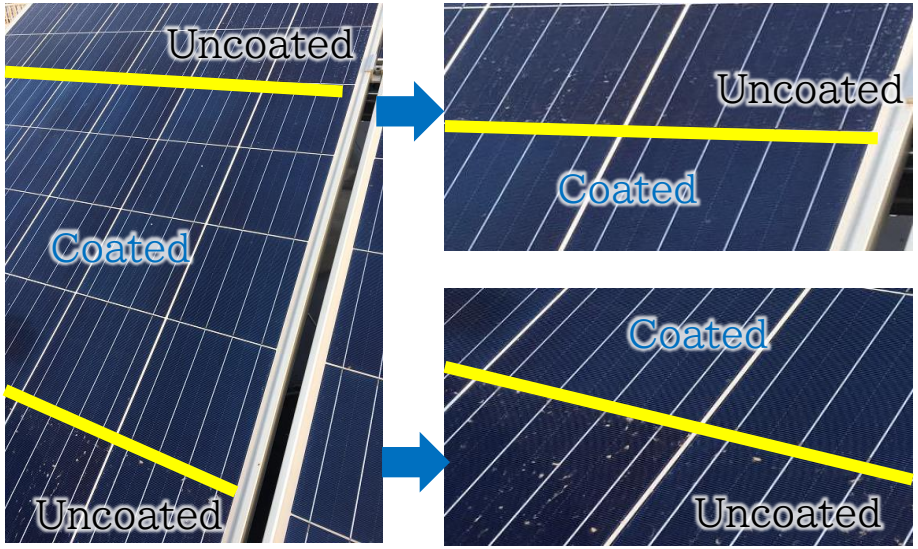
◆Verification of antifouling effect on concrete in Hong Kong Tai Lam Tunnel.

At the time of verification after 6 months.



Over-sea's Coating application example in China 2

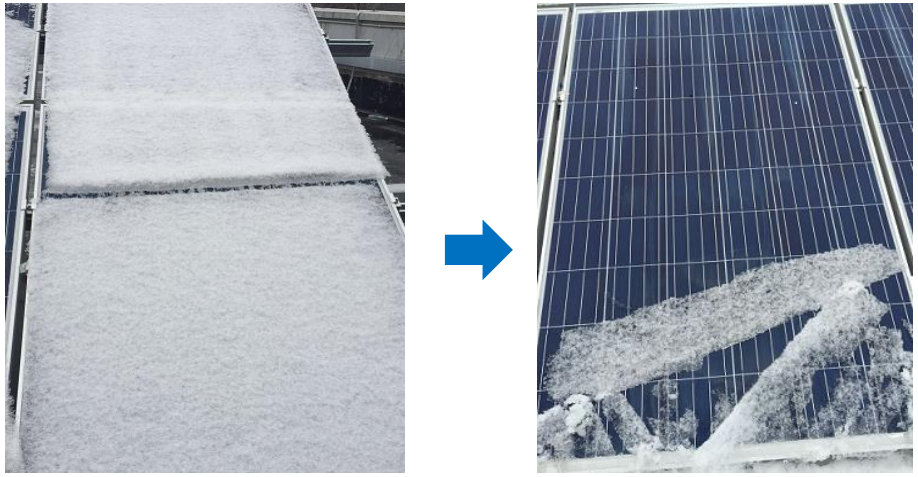
◆ Anti-fouling Test on PV panel surface in Xuzhou, China



One month after the test application, the difference in anti-soiling effectiveness between the coated and uncoated areas was clearly visible, leading to the decision for official adoption.

1,000㎡ was applied.

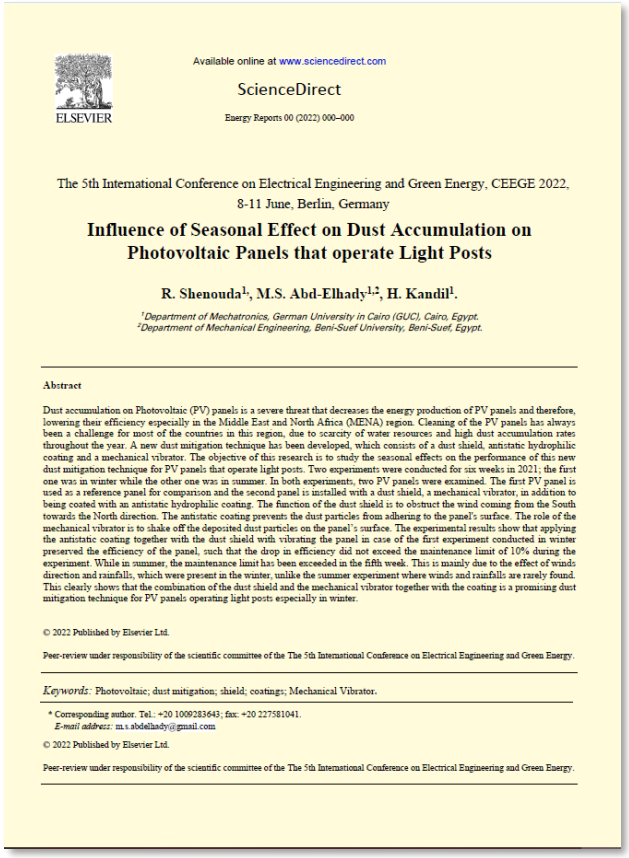
◆ The de-icing promotion effect was confirmed



The snow on the surface formed into a single mass and easily slid off.

After snowfall, on untreated surfaces, the snow adheres to the substrate and freezes. However, when the surface is in a super-hydrophilic state, the snow freezes as a thin ice layer. As the temperature rises and the snow begins to melt, the thin ice layer starts to thaw at an early stage. The resulting meltwater, aided by the super-hydrophilic effect, penetrates beneath the entire snow layer. As a result, the snow on the surface slides off easily as a single mass. This demonstrates the de-icing promotion effect.

Study on the Anti-fouling Performance to Solar Panels in Egypt



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Influence of Seasonal Effect on Dust Accumulation on Photovoltaic Panels that operate Light Posts

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Abstract

Dust accumulation on Photovoltaic (PV) panels is a severe threat that decreases the energy production of PV panels and therefore, lowering their efficiency especially in the Middle East and North Africa (MENA) region. Cleaning of the PV panels has always been a challenge for most of the countries in this region, due to scarcity of water resources and high dust accumulation rates throughout the year. A new dust mitigation technique has been developed, which consists of a dust shield, antistatic hydrophilic coating and a mechanical vibrator. The objective of this research is to study the seasonal effects on the performance of this new dust mitigation technique for PV panels that operate light posts. Two experiments were conducted for six weeks in 2021; the first one was in winter while the other one was in summer. In both experiments, two PV panels were examined. The first PV panel is used as a reference panel for comparison and the second panel is installed with a dust shield, a mechanical vibrator, in addition to being coated with an antistatic hydrophilic coating. The function of the dust shield is to obstruct the wind coming from the South towards the North direction. The antistatic coating prevents the dust particles from adhering to the panel's surface. The role of the mechanical vibrator is to shake off the deposited dust particles on the panel's surface. The experimental results show that applying the antistatic coating together with the dust shield with vibrating the panel in case of the first experiment conducted in winter preserved the efficiency of the panel, such that the drop in efficiency did not exceed the maintenance limit of 10% during the experiment. While in summer, the maintenance limit has been exceeded in the fifth week. This is mainly due to the effect of winds direction and rainfalls, which were present in the winter, unlike the summer experiment where winds and rainfalls are rarely found. This clearly shows that the combination of the dust shield and the mechanical vibrator together with the coating is a promising dust mitigation technique for PV panels operating light posts especially in winter.

Keywords: Photovoltaic; dust mitigation; shield; coatings; Mechanical Vibrator.

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This study evaluated the effectiveness of anti-fouling technologies on solar panels installed on streetlights in Cairo, Egypt. The primary objective of the research was to investigate the seasonal impact of a new anti-fouling system that combines an anti-soiling shield, an anti-static super-hydrophilic coating, and a mechanical vibrator.

Experimental Results

Winter (December 2020 – January 2021):

- The "shield panel" with the anti-static super-hydrophilic coating maintained an efficiency reduction rate of less than 10% over six weeks.
- The cleaning effect from rainfall was significant; in the fourth week, the normal panel showed only a 13.4% improvement, while the shield panel improved by 39.6%.
- The combined effect of the mechanical vibrator minimized dirt accumulation even in dry conditions.

Summer (June 2021 – July 2021):

- Due to the absence of rainfall, the effectiveness of the coating was limited, but efficiency reduction was kept below 10% until the fifth week.
- In environments with minimal rainfall and wind, the effectiveness of the anti-soiling system was shown to weaken.

Conclusion

The anti-static super-hydrophilic coating, when combined with an anti-soiling shield and a mechanical vibrator, has been proven to be an effective anti-soiling technology, particularly in environments where rainfall can be expected. This system enables the maintenance of solar panel efficiency on streetlights and is expected to reduce maintenance costs.