

# *Eco-Blocks for Eco-Schools*

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**Turning Wastes to Environmentally  
Friendly Construction Materials**

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*The Hong Kong Polytechnic University*

# Environmental problems in Hong Kong include:

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⌘ Growing concerns of air pollution

⌘ Increasing waste quantities requiring disposal



# Recyclable waste materials

- ⌘ Construction and demolition wastes
- ⌘ Waste glass (e.g. glass bottles)
- ⌘ Coal ash



Recycled concrete aggregates



Recycled glass aggregates



Ash Classifier at Power Plant



# Experiment conducted in PolyU's laboratory



Constituents and recycled materials were mixed in mixer



Steel moulds for fabrication of blocks



Hand compaction of the wet mixed materials



Further compaction using a compression machine at a rate of 600 kN/min twice

## Manufacturing process in industry



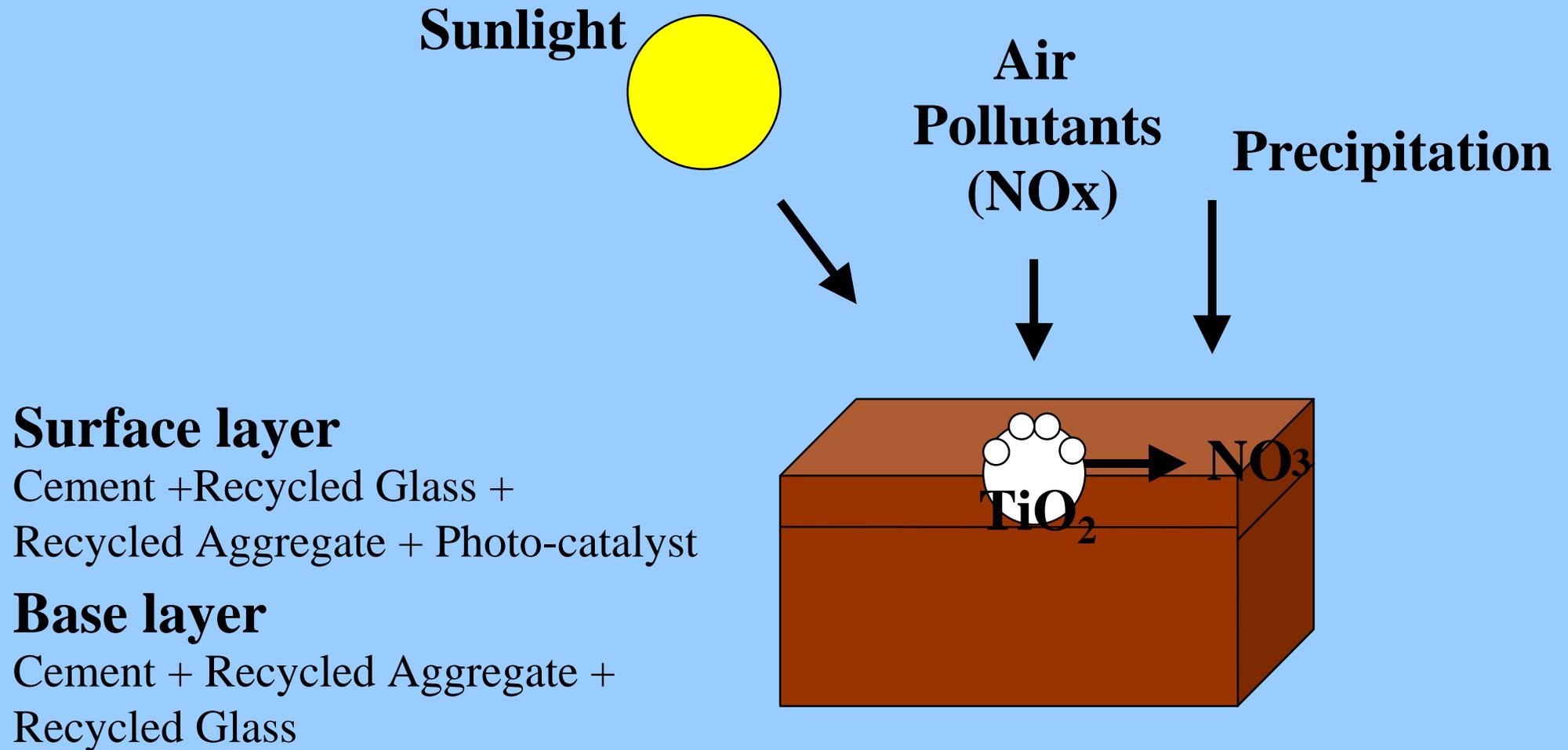
The mixer



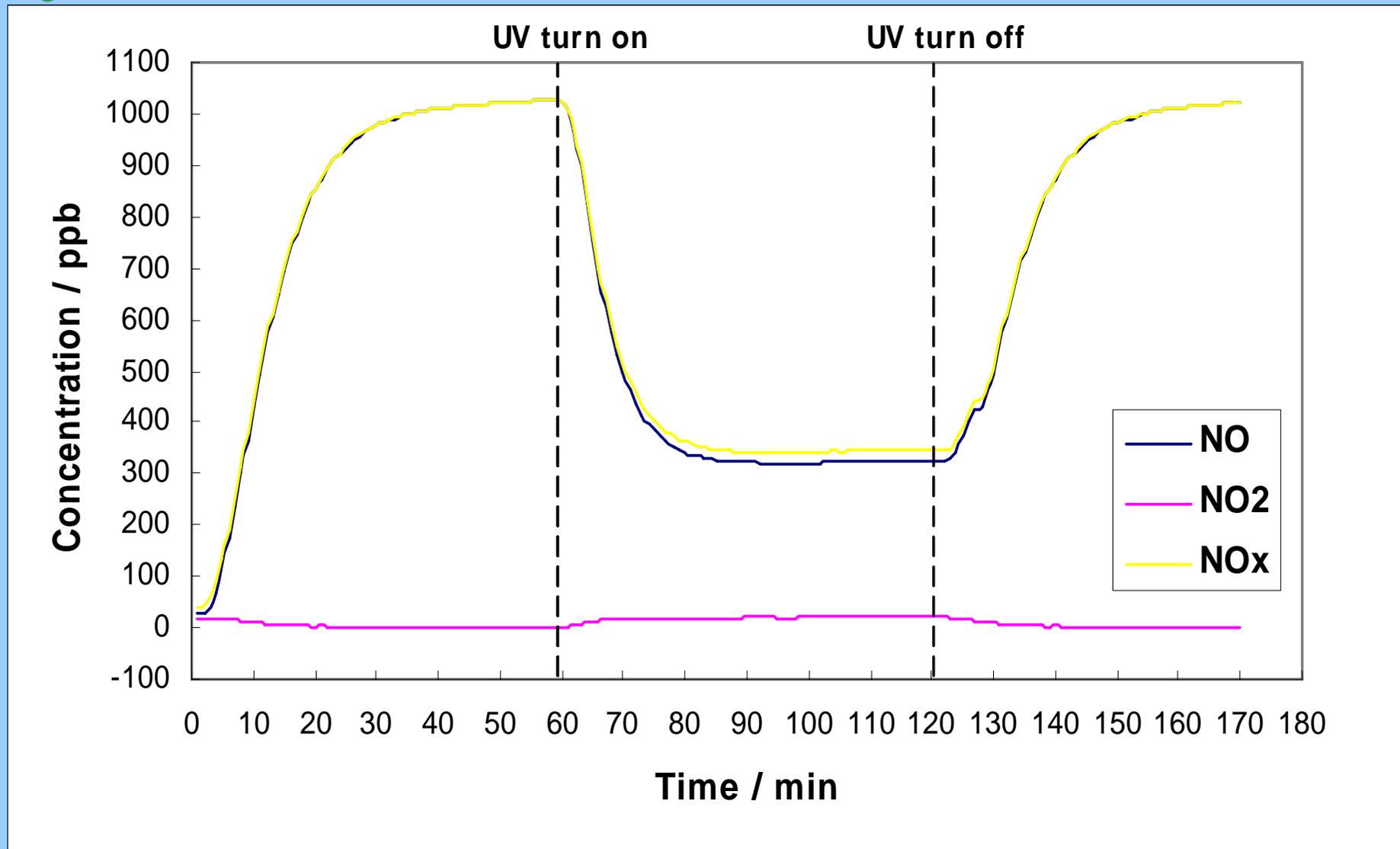
Block manufactured



# Air Pollutant Removal Process



# Photo-catalytic NO<sub>x</sub> removal results obtained in laboratory



# Pilot project at PolyU campus

Close-up of photocatalytic pavement and non-photocatalytic pavement

Distant view of paved area



Non-photocatalytic blocks

Photocatalytic blocks



# Eco-Blocks for Eco-Schools

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**PolyU's  
continuous  
environmental  
education &  
improvement  
project**



Project sponsored by  
HSBC Insurance  
(Asia-Pacific)  
Holdings Limited



*The Hong Kong Polytechnic University*

# Objectives

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- ⌘ The Hong Kong Polytechnic University (PolyU) has recently received a donation from HSBC Insurance to support one of the University's environmental education and improvement projects "Eco-blocks for Eco-Schools".
- ⌘ Under the project, premises of 10 non-profit academic institutions will be paved with a new environmentally friendly construction material called "eco-block", which can remove air pollutants, such as nitrogen oxides, to improve the environment.
- ⌘ Educate teachers and students about environmental protection and conservation
- ⌘ Continuous monitoring after laying provide data to ascertain the performance of the eco-blocks under real site conditions.



# Features of Eco-blocks

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- ⌘ It is a sustainable use of resources as it incorporates the use of waste glass, construction waste and fly ash, with a small amount of titanium dioxide.
- ⌘ It has air pollutant removal capability; it can remove air pollutants such as nitrogen oxides by at least 20% in the laboratory.
- ⌘ It received two green awards in recent years.
- ⌘ It is equivalent to conventional blocks in all performance.
- ⌘ It can be used in both pedestrian areas and vehicular access areas.
- ⌘ It is superior to conventional blocks in terms of water absorption, hardness and aesthetic values.
- ⌘ Its physical life-span is expected to be equivalent to the conventional blocks.



# Eco-Blocks 環保磚



第一代



第二代

**Recycled Aggregate**

**Recycled Aggregate + Recycled Glass**



第三代

**Recycled Glass + Recycled Aggregate + Photo-catalyst**



# Benefits to schools

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- ⌘ No fee will be charged to school
- ⌘ Improved school environment
- ⌘ Improved air quality
- ⌘ Demonstrate sustainable use of resources and reduce pressure of waste disposal in Hong Kong
- ⌘ Educate students on environmental protection
- ⌘ Receive a set of educational materials on waste recycling and environmental protection
- ⌘ Teachers will be trained to use the educational materials
- ⌘ Supplementary educational activities such as visits to eco-block factories will be organized for teachers and students
- ⌘ Continuous monitoring and assessment of the performance of the blocks and school feedback will be provided during the project period.



# Selection criteria of participating schools

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- ⌘ Schools must have passion for educating students about environmental protection and conservation;
- ⌘ Willing to assist in the work of paving and monitoring the performance of the eco-blocks;
- ⌘ Half of the 10 selected schools are preferably located in urban areas, while the others are in sub-urban areas for the purpose of result comparison;
- ⌘ School campuses have around 100 sq. metres of outdoor landscaping area for laying the eco-block;
- ⌘ School allow a suitable location (e.g. wall surface) to accommodate a small plaque to acknowledge the project and the donor (PolyU and HSBC);
- ⌘ Schools should allow around 7-10 days for paving the blocks;
- ⌘ Allow PolyU staff to take samples periodically (approximately once per month)
- ⌘ PolyU has final discretion in choosing the suitable sites.



# *Eco-Blocks for Eco-Schools*



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# Contact details

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