

## A15-038

Roof Exhaust Fan

屋頂排風扇

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## 作品摘要

臺灣長年氣溫偏高，尤其是工業廠房和倉庫，若沒有適當的通風設備將建築物內的熱氣及廢氣排出，並引進屋外新鮮空氣，將會影響到人員健康與生產效率，同時亦造成產品儲存的安全問題。對於工業廠房，由於生產環境的關係，可能蘊含著各種空氣污染源，連續或間歇性地釋出各種懸浮微粒和有毒氣體，在不良通風條件下，室內空氣污染物濃度逐漸累積，危害人體健康，造成人體不適，嚴重者甚至中毒死亡。

由於自然通風球對通風效能的改善率約為 2%~8%，往往不能令使用者滿意，通風球的主要原理是利用室內溫度高於室外時，形成煙囪效應，室內熱空氣自然向上排出，其次是戶外氣流吹到通風球渦輪葉片，使得通風球開始轉動，但是此時戶外空氣會從渦輪葉片間的縫隙灌入通風球內部，剛好和室內排出的汙濁空氣相抵觸。本專題研究如何改進通風球結構，首先就是將兩股氣流隔開，不讓兩股氣流相抵觸，並且加裝通風電扇，利用太陽能和風力能來提供電扇所需的電力，形成一個自給自足的小型電力系統。

Taiwan high temperatures for many years, especially in industrial plants and warehouses, if there is no proper ventilation and exhaust hot air inside buildings, and intro of fresh air, will affect human health and productivity, but also result in product storage security issues. For industrial plants, because the production environment and poorly ventilated conditions, it may contain a variety of air pollutants, continuously or intermittently to release a variety of toxic gases and aerosols. The concentration of indoor air pollutants gradually accumulate and endanger human health, cause human discomfort and even death.

Due to improved natural ventilation rate of ventilation ball effectiveness about 2% to 8%, they can't make user satisfaction, the main principle of ventilation ball is that when the indoor temperature is higher than outdoor use, form a chimney effect, indoor hot air discharge, followed by outdoor ventilation airflow blown ball turbine blades, making ventilation ball begins to turn, but this time the outdoor air ventilation will be poured into the ball from the gap between the turbine blades, just discharged polluted indoor air contravene. This case study on how to improve ventilation ball structure, the first is to separate the two streams, and the installation of ventilation fan, use the solar and wind energy to provide the fan power required to form a self-sufficient the small power system.