Improving Workspace Environment Through Changing Design Strategies in Clothing Factories

Mohatat Hossain, PhD, The University of Nottingham | Robin Wilson, PhD, The University of Nottingham | Benson Lau, BBA, MPhil, The University of Westminster | Brian Ford, BBA, Natural Cooling Ltd

Garment Factories in Bangladesh

The indoor workspaces of the multi-storey ready-made garment factories are usually overheated due to the high amount of internal heat gain and lack of uniform ventilation. As a result, workers who labour 10-12 hours per day suffer from thermal discomfort and health issues. It also hampers their productivity. As a continuation of a previous paper, this poster presents two design approaches improving the workspaces.

### Changing Functional Layout

- **Proposed Change of layout**
  - **Existing layout**
  - **Layout Option 1**
    - Workstations facing towards east/west side
    - Workers get airflow from the left/right side
  - **Layout Option 2**
    - Workstations facing towards north/south side
    - Workers get airflow from the front/back

### Adding Ventilation Shaft

- **Existing floor plates without shaft**
  - Existing 25% of the floor plate without shaft was considered.
  - A shaft needs to be proposed where three adjacent floor plates exist.

- **Floor plates with a central shaft**
  - The results gained from the Optivent revealed that during the cool-day, hot-day and warm-humid seasons, average natural air speed (resultant value of horizontal and vertical direction) of 0.23, 0.18 and 0.1 m/s can be maintained within the selected volume of the building. Outlet size was determined by using Optivent.

### Simulation Results

#### Key Findings
- Improvement of thermal environment of existing workspaces of garment factories can be made through changing functional layout and adding passive ventilation shafts.
- These approaches can increase the air circulation across the floor space providing additional air speed of 0.45 m/s towards the horizontal direction which may increase thermal comfort, in particular, during the warm-humid season.