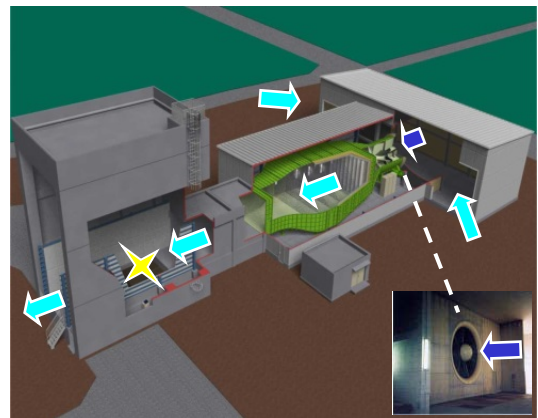


# Fire Wind Tunnel

## ● Purpose and Background

Fire wind tunnel is the unique facility for measuring the effect of wind on fire and plume behavior. The results of experiments using this facility have been contributing to the development of fire safety engineering.

Japan has been suffering from conflagrations in urban areas congested with wooden houses and small buildings. It is known that fire spread in urban areas greatly depends on the velocity and direction of wind. Therefore, studies on the effect of wind are significant to control the damage of conflagrations. Various kind of experiments have been accomplished already by using the fire wind tunnel.



Overview of fire wind tunnel



Huge fan



Rectifying channel



Measurement channel

## ● Representative Experiments and Outcomes

The fire wind tunnel is able to generate the rectified air flow close to full scale using a huge fan with a diameter of 4 meters. The flow in the measurement channel reaches average velocity up to 10 m/s. The following experiments using such a unique feature have been conducted:

- 1) Fire behavior of wooden buildings under wind
- 2) Thermal behavior of wind-blown fire plumes
- 3) Effect of wind around high-rise buildings on fire spread
- 4) Wind-driven firebrands and spotting ignitions
- 5) Effect of wind on smoke movement in large-scale room

Results of experiments have been the basis for the development of urban fire simulators and the fire safety guidelines for urban planning. The fire wind tunnel is expected to keep contributing to the fire safety of urban areas.



Ejected flame from an opening under wind



Radiation shielding of trees



Roof ignition due to firebrands



Fire spread between model buildings