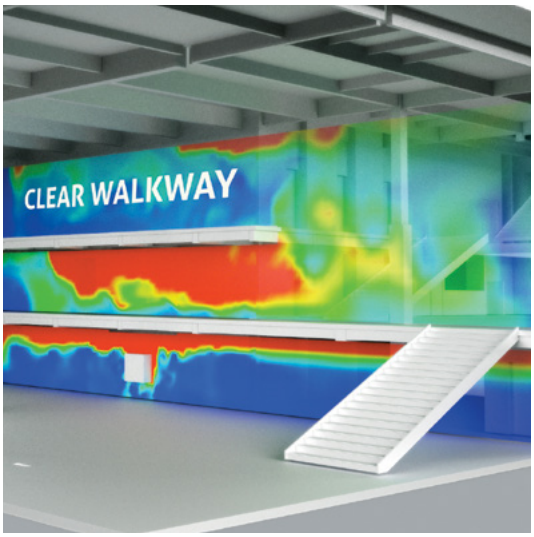
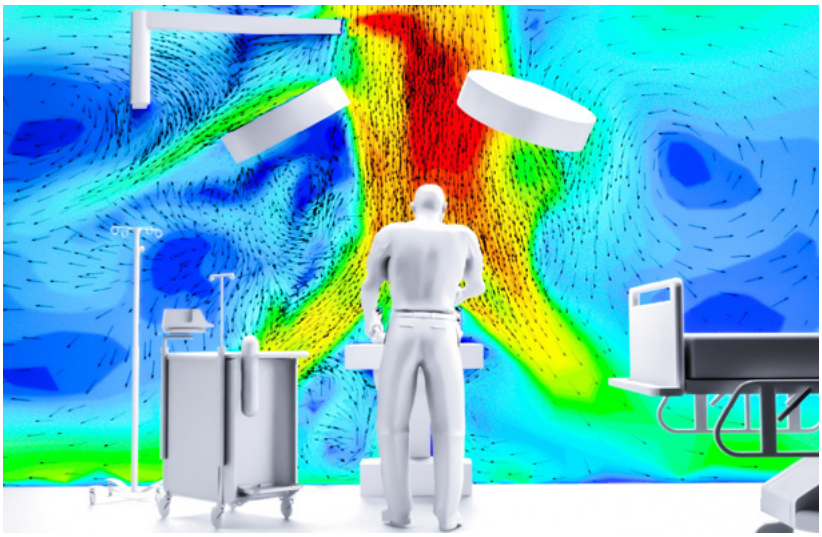
VENTILATION

Ensuring livability, safety and efficiency through effective management of circulated air





Well-designed ventilation performs many (largely invisible) functions. It provides comfort through heating and cooling. It delivers clean, odor-free air through filtration and air exchange with the outdoors. In some cases, it controls contaminant levels (e.g. industrial ventilation and emergency smoke control systems).

In specialized spaces, such as operating rooms and laboratories, a ventilation system may control many aspects of the indoor environment to ensure the occupants' safety.For a building to perform well, the ventilation system must offer maximum comfort, safety and air quality while minimizing energy costs.

Our Service

We help you design effective and efficient ventilation that will create value for all occupants and owners of your building.

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We have the in-house experience, expertise, computational resources and process to handle a wide range of problems in ventilation design, from routine to complex. We also specialize in the particular challenges of passive ventilation. We'll offer early advice and concepts based on experience and back them up with further studies if needed, especially for particularly complex or critical systems. These studies might include proof-of-concept analytical modeling or even computational fluid dynamics (CFD) modeling coupled with wind-tunnel testing. When a big-picture look is needed, we call on the full range of RWDI's services, including energy, meteorology or microclimate analyses.

But whatever the project, big or small, simple or complex, we start fresh. We aren't wedded to particular analysis tools or design approaches: We are independent and can challenge the status quo. Our only objective is to produce an unbiased design that's in the best interests of your project.

Typical Applications

- General office contexts
- Industrial contexts
- Natural ventilation
- Public realm (between buildings)
- Smoke control
- Specialized environments (e.g., operating rooms, labs)

RWDI is a valuable partner to clients seeking to...

Explore Innovations

- Proceed with confidence that innovative design choices will work
- Deliver effective natural ventilation configurations
- Reduce cooling energy by delivering ventilation air more efficiently
- Provide safer spaces through better pollutant and smoke control systems

Create Opportunities

- Reach better designs sooner—and at less cost—though quick feedback based on experience and screening calculations
- Save money by using smaller fans in carefully selected locations
- Select the *right* ventilation strategy—not just the easiest—with independent advice to ensure that all options are considered

Meet Challenges

- Find pragmatic solutions to ventilation challenges
- Implement robust life-safety systems for smoke management and pollutant control
- Ventilate highly sensitive equipment for best performance

Fulfill Expectations

- Provide specialized work spaces that comply with occupational safety and health requirements
- Implement life-safety systems that meet local code requirements while minimizing exhaust air quantities.

How we work

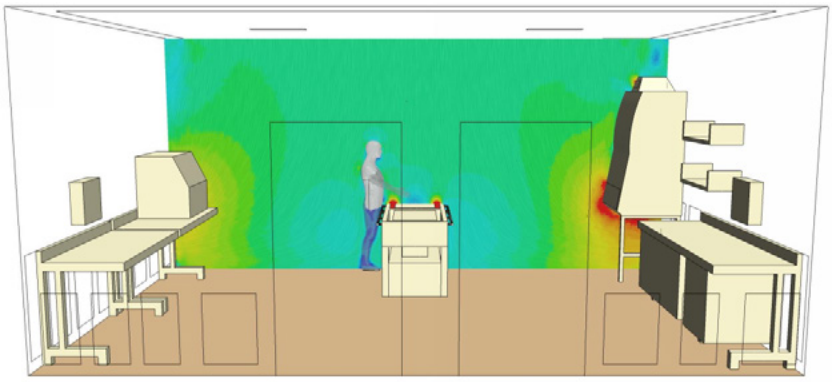
Our consultants can work with you to design a ventilation system within a space of any size—as small as a single office or a façade cavity or as large as a sports stadium, either open or closed.

At early stages of the project, we can offer quick recommendations based on past experience and screening calculations. As the project moves forward, our analysis can become more sophisticated and offer deeper levels of assessment. At this stage we may use computational fluid dynamics (CFD) or wind tunnel studies, or both, if warranted. Our recommendations are based on a pragmatic approach in which we balance cost, energy and complexity. We are unbiased in our options and hence are free to offer innovative approaches.

Considerations

To arrive at a solution we balance many factors. First of all, ventilation strategies must be consistent with the need. Some spaces are focused on the health and comfort of people or animals. In others, the goal is to control indoor conditions so that sensitive equipment performs correctly. Special applications (e.g., laboratories) add more requirements, such as managing contaminants and controlling temperature.

Another factor is how to move the air. The manner in which air is introduced into a



space can sometimes be more important than the flow rate. Choices here affect energy efficiency. The conventional choice is mechanically driven fans. Correct sizing and placement of supply and return registers is essential. We can model airflows in detail to find the exact locations where a supply point will be most effective. Thus, you can save money either by using smaller fans or moving less air.

However, fans aren't the only solution. Ventilation can also be driven naturally through a combination of buoyancy and wind forces. This strategy saves energy but requires careful design to ensure adequate air movement. RWDI has many years of experience working with stack effect and wind pressures. We combine these to generate working natural ventilation strategies.

Representative projects

We have worked with clients to develop creative, efficient solutions in the following types of spaces, among many others.

- Natural ventilation: Stadia, high schools, transit stations, atria, shopping malls, large industrial spaces, transformer vaults, antenna arrays and double-skin facades.
- Mechanical ventilation: Industrial pollution-capture systems, lecture rooms, office spaces, convention centers, stadia and transit station smoke management systems.
- High-performance spaces: Data centers, operating rooms, laboratories, museum preservation rooms, electronics clean rooms, patient isolation rooms and telescope domes.