

Architectural Record

Designing Healthier Environments

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CEILING & WALL SOLUTIONS




From healthcare facilities to office spaces, schools, and virtually every type of building, creating a healthy atmosphere is vital to draw folks in. Daylighting, acoustics, ventilation, furnishings and so many more factors affect the user experience and this eBook presents examples of good designs that achieved the goal of creating a more healthy environment for their inhabitants. I hope you enjoy the curated content included here and thanks for being a RECORD reader.

A handwritten signature in black ink, reading "Alex Bachrach".

Alex Bachrach, Publisher
ARCHITECTURAL RECORD

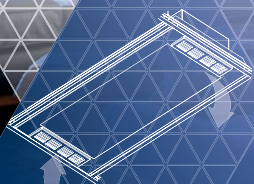
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CEILINGS DESIGNED FOR HEALTHY SPACES

Indoor environmental quality begins at the ceiling for occupant comfort and well-being. Acoustics, air quality, light, aesthetics, sustainable materials, and other factors all play a role in how well people perform and feel in a space. 24/7 Defend™ products are designed to contain, clean, and protect with the VidaShield UV24™ Air Purification System that helps neutralize harmful pathogens in a room's air and AirAssure™ ceilings that increase the effectiveness of in-ceiling air filtration and purification systems up to 40%. The panels can also help with acoustics while meeting the most stringent industry sustainability standards. Learn how ceilings make a difference at armstrongceilings.com/healthyspaces



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24/7
DEFEND™
Solutions for Healthier,
Safer Spaces

CALLA™ HEALTH ZONE™ AIRASSURE™ WITH VIDASHIELD UV24™ AIR PURIFICATION SYSTEM / CMD CONSTRUCTION, IRVINE, CA

Armstrong®
CEILING SOLUTIONS

New Suspended Ceiling Technologies Can Help Limit Airborne Transmission of Viruses and Germs

A Healthy Return to the Office Requires an Ongoing Focus on Indoor Air Quality

THE RISK of contracting COVID has changed, even for those fully vaccinated, and has spurred heightened awareness of how to stay healthy indoors, with many workers nervous about returning to their desks.

A critical part of re-entry is assurance that employers are providing a safe, healthy environment with improved indoor air quality. To that end, employers need to take precautions to comply with guidelines to minimize exposure to not only COVID-19 but also the airborne transmission of other viruses and germs long present in indoor environments as well.

Science has learned much about the spread of viruses over the past year and there are some clear evidence-based steps that can be taken to protect workers. Since the coronavirus and other pathogens are spread via tiny airborne droplets, one such step is an upgrade in the ventilation and filtration systems before bringing workers back. It is important for employers to make decisions now that will benefit the safety and health of workspaces into the future.



Armstrong AirAssure ceiling panels easily retrofit into existing grid systems, incorporate a gasket in their design, and have been proven to increase the effectiveness of in-ceiling air filtration by up to 40%.

Office Environment Concerns

According to the U.S. Centers for Disease Control and Prevention (CDC), studies have shown that transmission of COVID-19 from inhalation of the virus in the air can occur at distances greater than six feet. In addition, particles from an infected person can move throughout an entire room or indoor space. The particles can also linger in the air after a person has left the room. They can remain airborne for hours in some cases.

Though the risk of infection by breathing in particles carrying the virus generally decreases with distance from infected people and with time, some circumstances increase the risk of infection:

- Being indoors rather than outdoors, particularly in indoor environments where ventilation with outside air is inadequate
- Crowded or shared spaces
- Activities like speaking loudly, singing, or exercising
- Prolonged time of exposure (e.g., longer than a few minutes)

To combat the potential spread of viruses like COVID-19 and other airborne pathogens now and in the future, safeguards need to be increased not just for COVID but also for the long term to meet occupants' ongoing needs for indoor health and a sense of well-being.

Today's Office Environment

With a better understanding of today's workplace, the challenges

facing a return to the office are clear. Research from the World Health Organization (WHO) suggests heavily populated environments with poor or insufficient air flow raise infection rates. The WHO further encourages good ventilation in all closed settings.

Similarly, in May 2020, the CDC updated its "Guidance for Businesses and Employers Responding to Coronavirus Disease 2019" suggesting employers seeking to resume normal business operations improve the building's ventilation system.

HVAC Recommendations

In providing guidance on healthy workplace procedures for the return to offices, the CDC cites HVAC airflow recommendations from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). In its April 2020 "Position Document on Infectious Aerosols," ASHRAE states while ventilation systems cannot address all aspects of infectious control, "changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures."

The document lists several recommendations employers should consider to reduce occupant exposure to infectious aerosols. Among them are strategies to improve ventilation through dilution, airflow patterns, filtration, and pressurization.

Leakage Control

An additional effective strategy is utilizing suspended ceiling



The VidaShield UV24 In-Ceiling Air Purification System from Armstrong helps neutralize harmful airborne pathogens using patented UV-C ultraviolet air cleaning technology to continuously reduce levels of viruses, bacteria, and fungi in a room's air.

technologies in combination with improved filtration. For example, specially engineered suspended ceilings are a proven technology in medical patient rooms, clean rooms, and labs to help prevent the spread of contaminants. Today, suspended ceiling panels are available that incorporate a gasket in their design. The gasket is placed between the ceiling tile and grid to

form a tight seal and help contain and control airflow and the potential spread of infectious particles into the plenum and other areas of the building.

By helping to reduce air leaks, the tighter seal can also increase the efficiency of HVAC filtration. Increasing the effectiveness of HVAC systems could be one of the keys to controlling the transmission of viruses like COVID-19 and other infectious particles. An efficient system allows more contaminants to be exhausted into filters that clean the air of viruses, germs, and bacteria.

An added challenge today is the trend of higher ceilings that expose duct and pipe work.

The incorporation of a suspended ceiling reduces ceiling height and thus the volume of air needing to be exhausted. A metric used to measure the amount of air entering and exiting a room is air changes per hour (ACH). Installation of a suspended ceiling increases ACH and lowers the time it takes to clear a space of airborne contaminants.

Armstrong Ceiling Solutions

To help ensure healthier environments that are adaptive and resilient for the long term, Armstrong Ceiling & Wall Solutions offers a range of suspended ceiling options and new ceiling technologies. These products fall under the Armstrong 24/7 Defend™ platform. They include the CleanAssure™ portfolio of ceilings, walls and suspension systems that meet CDC

The air purifier panels use ultraviolet light to deactivate pathogens. Third-party test results show the system neutralizes 97% of infectious pathogens in aerosols during the first pass of air through the system.

recommendations for cleaning and disinfecting and the AirAssure™ family of ceiling solutions. Both easily retrofit into existing grids. Most are also in the Sustain® portfolio, meeting the most stringent industry sustainability compliance standards today.

The CleanAssure family of products can be cleaned by wiping, spraying, or fogging to make spaces cleaner and healthier. AirAssure panels incorporate a gasket and improve indoor air quality by reducing airflow leakage through the ceiling plane. The panels have been proven to increase the effectiveness of in-ceiling air filtration by up to 40%.

Armstrong also offers the VidaShield UV24™ air purification

system that integrates with its ceiling systems. The air purifier panels use ultraviolet light to deactivate pathogens. Third-party test results show the system neutralizes 97% of infectious pathogens in aerosols during the first pass of air through the system. Each unit provides room-based continuous air cleaning from the ceiling plane through a patented, shielded UV-C chamber, and increases the number of air changes in a space.

Summary

As the nation's economy rebounds and workers return to all types of indoor spaces, ensuring a safe and healthy environment is critical now and for the long term. The confidence of knowing systems and facilities have been implemented or upgraded to potentially reduce the transmission of COVID-19 or other viruses, bacteria, and germs is paramount to increasing a sense of occupant well-being before the return of many to their traditional spaces.

For More Information

Much of the information above is drawn from a white paper prepared by the Thompson Research Group illustrating how air quality and suspended ceiling technologies can play an important role as stand-alone solutions or in conjunction with other products to reduce the spread of infectious aerosols. To view the entire white paper and learn how to create healthier spaces, visit armstrongceilings.com/healthyspaces.



From the drop-off facing north,
visitors enter the first level.

Medical Pedigree

Ballinger's new ambulatory care center, Penn Medicine Radnor, is rooted in history.

BY SUZANNE STEPHENS
PHOTOGRAPHY BY ALBERT VECERKA/ESTO

ALTHOUGH Penn Medicine Radnor, which opened in 2020 in suburban Philadelphia, is strictly an ambulatory care center, it belongs to an august medical family tree. It is descended from Pennsylvania Hospital, the first such institution in this country, founded by Benjamin Franklin and Dr. Thomas Bond in Philadelphia, in 1751. Through a merger between the original hospital and the University of Pennsylvania Health System (UPHS) in 1997, it now is connected to more than a dozen health-care facilities of varying specialties in the Philadelphia area.

UPHS's decision to build a large, 250,000-square-foot structure—to serve 1,500 outpatients a day—in Radnor township was simple. “We wanted to provide as much care as possible close to home,” says Tracey Commack, the hospital's associate executive director. The array of services ranges from endoscopy, radiation and oncology, audiology, ophthalmology, neurosciences, and dermatology to a heart and vascular center. Designed by Ballinger, architects and engineers based in Philadelphia, the center is unlike most



A landscaped courtyard is enclosed by two hospital wings, which are linked by a two-level pedestrian bridge

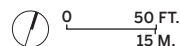
centralized hospitals because it is part of a mixed-use development, next to a high-speed intercity railway, that will eventually include an office building (also designed by Ballinger) and a hotel (architect to be determined). UPHS purchased the 22.6-acre site in 2015, but, since the parcel was larger than



FIRST-FLOOR PLAN



SECOND-FLOOR PLAN



SITE PLAN



Glazed stairwells jut into the courtyard

needed for its medical program, UPHS, with Ballinger as the master planners, sought a mixed-use zoning to amend the pharmaceutical lab-and-office one that previously existed when Wyeth Ayerst Pharmaceuticals company, by then defunct, occupied the site. Brandywine Realty Trust is the developer of the two nonmedical components.

Wyeth Laboratories—as it was initially called—had been designed by Skidmore Owings & Merrill (RECORD, April 1957), with low-slung, blue-green glass and porcelain volumes. While its

Midcentury Modern look was distinctive, the renovation needed for the UPHS program was deemed too extensive to keep the architecture, and so the buildings were razed. “Not only were the existing ones inefficient for health operations,” says Ballinger principal Eric Swanson, “the former complex depended on surface parking instead of garages—which didn’t help stormwater management.”

Only the concrete from the foundations was salvaged; it was recycled, cut, and used for fill to regrade the land, as well as for the base of the ground-level hospital slab.

To adhere to the height-limit and size requirements of the new zoning, Ballinger designed a U-shaped structure, four stories high, with a steel frame and a sleekly tailored iron-spot-brick rainscreen. A 1,000-car precast-concrete garage, six stories high, hovers above its east end near the railroad tracks. From the garage, patients can enter the hospital on the ground level, obviously a boon in bad weather. Stepping into the lobby, they behold, through floor-to-ceiling glass expanses, a lushly planted garden with outdoor seating, enclosed by the facility’s two wings. Beyond, a meadow rises gently to the west, concealing any glimpse of a main road on its other side.

The architects emphasized the knoll-like configuration



Plantings can be viewed from the waiting areas and hallways (top). The clinical pods (bottom) have views out as well.



The pedestrian bridge overlooks it on both sides (top); a meadow extends to the west (bottom),

of the land to place the main entrance on a higher level than the one on the ground floor accessed by the garage. Here, on the north, a porte-cochère for drop-off brings visitors into the first floor, where they find a café and retail shop, and can survey the green courtyard one level below. On the second and third levels, the two wings of the U, one angled away to avoid a parallel alignment with the other, are linked by pedestrian bridges. As you walk across these narrow—14 feet wide—glazed passages, you may want to linger: counters for laptops line one side and lounge chairs are arrayed on the other. Two glassed-in stair towers jut into the courtyard to bring visitors down to the garden, and encourage physical exercise.

According to Commack, evidence-based design was behind the attention to light and the views of plants and trees, seen not only at the point of arrival, or from the pedestrian bridges, but through the floor-to-ceiling glass expanses of the hallways and lounges, which overlook the grassy courtyard from much of the facility. Even some corridors of the clinical pods that branch off the main hallways terminate in windows showing glimpses of the verdant property. Since the greenery attracts a variety of birds, the design team placed fritted glass in the most vulnerable areas; elsewhere, glazing is etched or tinted.

On a weekday in the spring, the waiting areas were not



crowded; visitors and patients were socially distanced and wore masks, following Covid restrictions. The architects designed the waiting areas and exam pods so that they convey a modern Scandinavian simplicity through wood louvers and doors, and used assorted earth tones that echo the brick exteriors. Terrazzo floors provide a sheen to the well-trafficked areas on the first level (elsewhere, vinyl surfaces with a terrazzo pattern are substituted). Many walls have a lustrous plaster finish; others display plaster “paintings” abstractly relating to the landscape. Uplighting adds a soft ambient glow supplemented by the infusions of daylight.

Jonathan Alderson Landscape Architects, based in nearby Wayne, created the sustainable natural setting that adheres to Penn Med’s biophilic orientation. The firm centered the courtyard around a basin-shaped rain garden that captures stormwater and allows it to percolate into the ground instead of producing runoff. “A storm-management system is the backbone of our plan,” says Alderson, who also specified native plants such as penstemon, baptisia, and phlox to help in this endeavor. Paths threading through the garden and meadows are composed of porous chips of recycled tire and stone, which also help water absorption.

In the courtyard, Jonathan Alderson Landscape Architects planted a rain garden.



Alderson favored meadows over lawns since they don't need to be irrigated. Some large trees were saved, and over 100 new trees have been planted on the hospital site; 150 more trees will be added to the entire complex.

The 1751 progenitor, Pennsylvania Hospital, had a “physic garden” to grow plant ingredients for medicines, so perhaps Penn Medicine Radnor is showing its ancestral DNA. But there is evolution: now the extensive vegetation has psychological benefits, and the stormwater measures and other strategies place Penn Med Radnor on track to qualify for a LEED Gold certification.

As another evolutionary step, the mixed-use development concept offers an intriguing business model for future health-care facilities of a decentralized yet specialized type. True, the pandemic and its economic fallout have delayed the construction of the hotel and the office building. Brandywine is still seeking an anchor tenant for the work space, known as 155 Radnor, and is marketing the future building with an emphasis on health (touchless features, antimicrobial environments, 100 percent outside-air circulation) and the connection to nature. The developer's plans for the hotel are further off, although the clientele would seem to be in the area—not only patients who want to stay close to the hospital, but visitors to nearby colleges.

While the ambulatory facility appears more clinical than a hotel, the design imparts a serene ambience. It is too early for studies at the hospital to determine how the entire environment,

the luxuriant landscaping included, fosters the cure and treatment of its patients. But this seems to be a good start and is certainly attuned to the progress being made in hospital design today, with its attention to evidence-based design, biophilia, and sustainability. ■

Credits

ARCHITECT: Ballinger — Eric Swanson, principal; Christina Grimes, health-care planner; Thomas J. Parr, project manager; Jason Cole, lead designer; Charlotte DiGiorgio, Mike Euker, Cyrus Dezfuli-Arjomandi, project architects; Angela M. Fante, chief structural engineer; Brent Ellman, project structural engineer

ENGINEERS: Ballinger (structural); Stantec (m/e/p); Pennoni (civil)

CONSULTANTS: Jonathan Alderson Landscape Architects (landscape); LEED (Atelier Ten)

CLIENT: Penn Medicine

SIZE: 250,000 square feet

COST: \$230 million

COMPLETION DATE: June 2020

Sources

MASONRY: Endicott

METAL PANELS: Kingspan

CURTAIN WALL: YKK AP

BUILT-UP ROOFING: Sarnafil

GLASS: Vitro

ENTRANCES: CR Laurence

ACOUSTICAL CEILINGS: Armstrong

ELEVATORS: Kone

MOISTURE BARRIERS: GCP

Returning Workers Seek Workspaces That Address More Than Safety

2021 Pulse Point Occupants Survey Reveals Desires for Spaces Fit for Sustainability and Personal Well-Being

LANCASTER, Pa. — Employee expectations of post-pandemic indoor workspaces go beyond a “return to normal” and demonstrate a desire for spaces that put people in a better place, with an eye toward spaces that are more responsive to an ever-adapting world, according to a survey conducted by Armstrong World Industries, Inc. (AWI).

The survey “*Making Space for A Resilient Future*” revealed six trends that point to a need, and an opportunity, to approach the design of indoor workspaces more holistically, beyond merely fixing pandemic-related health and safety concerns.

Among the findings:

- 86% of respondents expect to feel very or somewhat safe in their workspace when they return to work.
- 83% of respondents expect to feel that their workspace will be prepared and adaptable for future events such as another pandemic or the changing climate.
- 84% of respondents expect to feel that their workspace will be an environment which is supportive of the well-being of people.



[Download Infographic](#)

The survey comes as companies across the country, including Amazon, Duke Energy, Facebook, and Microsoft have announced total or hybrid returns to work in the coming months and into the fall. Armstrong, a leader in the design and manufacture of

innovative commercial and residential ceiling, wall and suspension system solutions, conducted the online survey of 1,000 U.S. workers who typically work in indoor environments in February 2021. It explored employee feelings about and perceptions of work environments at offices, schools, and healthcare facilities as a result of what has been experienced due to the COVID-19 pandemic.

The findings are reflective of the pandemic's influence in heightening awareness and understanding of the importance and interconnectivity of healthy environments and one's own personal environment. These themes are echoed in new 2030 commitments from AWI to cultivate thriving environments for employees and communities, more actively meet demands for healthier, circular products, and do more with less to preserve and protect the planet's resources.

"Attitudes of returning workers are clearly at an important inflection point," said Mark Hershey, senior vice-president, and executive sponsor for sustainability at AWI. "As we work with leaders in architecture and design, we can see an opportunity for all workplace sponsors to prepare space in a way that restores trust by providing workspaces that are safe and healthy, supportive of well-being, and prepared and adaptable for the future," he added.

The six pulse point trends show that:

1. Preparing indoor workspaces for returning workers isn't just about COVID-related safety improvements.
2. Employees are "giving permission" to landlords and employers to prepare workspace, not just for a "return to normal," but for something that puts people in a better place, with an eye toward the future...and being responsive to what is now being realized as an ever-adapting world.
3. Addressing indoor workspace should move beyond just fixing pandemic-related concerns toward approaches that are more holistic in nature and embrace resilience and well-being.
4. Indoor workspace must be invested in as an asset for attracting and retaining talent, and replicating the themes of comfort and well-being employees have experienced as they have worked from home.
5. Volatility and ongoing changes to spaces caused by pandemics, climate change and more, are here to stay, but working safely and comfortably within indoor environments is possible. Workspaces can and should be created to serve as environments in which people feel all together better.
6. What makes a workspace safer can also make it healthier, more sustainable, and better for total well-being. ■

Find more information in our [downloadable infographic](#). To learn more about sustainability at AWI and our 2030 commitments visit www.armstrongceilings.com/sustainability. For more information on Armstrong solutions to create healthier spaces, visit www.armstrongceilings.com/healthyspaces.

CASE
STUDY

Project: Encompass Health
Rehabilitation Hospital

Location: Middletown, DE

Product: Calla® Health Zone™
AirAssure™ ceiling panels

THE CHALLENGE:

Encompass Health Rehabilitation Hospital of Middletown, DE is a provider of inpatient rehabilitation following a stroke, hip fracture, and other complex neurological and orthopedic conditions. It contains 40 beds and includes one patient room that functions as a negative pressure infection isolation room. The room is 19' x 19' and conditioned using one constant volume supply box and one dedicated exhaust fan.

The room was designed to operate at a minimum differential pressure of -0.020" w.c in relation to the adjacent corridor. However, the exhaust fan for the space could not always achieve the required -0.020 w.c. pressure, which caused nuisance alarms and, in some instances, a reversal of the room pressure when room doors opened. The actual exhaust air from the space was increased to the maximum extent possible for the exhaust fan.

THE SOLUTION:

Instead of replacing the exhaust fan to achieve the required room differential pressure and to help eliminate the pressure variability,



“We knew the ceiling would make a difference but didn’t know how much,” Roaten states, “and it performed much better than we imagined, nearly doubling the pressure differential in the room. We simply weren’t expecting that much of an increase.”

the facility replaced the existing ceiling panels with new Calla® Health Zone™ AirAssure™ ceiling panels from Armstrong Ceiling & Wall Solutions. When placed in a standard ceiling suspension system, AirAssure acoustical ceiling panels form a tight seal and reduce airflow leakage through the ceiling plane up to more than four times more than panels without AirAssure performance.

According to Tim Roaten, President of Eastern Air Balance of Manheim, PA, which conducted tests before and after installation of the new panels, the target was to maintain the minimum -0.020" w.c. pressure differential under all conditions. By changing the ceiling panels, room pressure increased to -0.0368" w.c., providing an 84% buffer above the design minimum. There

were no measurable changes to the supply and exhaust airflow in the space. The only change was the replacement of the existing ceiling.

The increase eliminated nuisance room pressure alarms and the need to replace the exhaust fan. It also brought the room into compliance without any other costly upgrades to the HVAC system. In addition, replacement of the ceiling only took a day, so extended downtime for the room was eliminated. Also eliminated were labor costs involved in caulking ceiling panel edges, an action some facilities are forced to undertake to achieve desired pressure.

“We knew the ceiling would make a difference but didn’t know how much,” Roaten states, “and it performed much better than we imagined, nearly doubling the pressure differential in the room. We simply weren’t expecting that much of an increase.”

Kevin McNeil, Director of Plant Operations for the hospital, agrees. “It was a significant improvement,” he says. “We are now able to maintain the required pressure throughout the day, which is especially important today because of the pandemic. If we need another room that requires negative pressure, I would highly recommend this system.” ■



THE POST-COVID WORKPLACE

Rethinking the Office

Research can guide architects in designing for flexibility and creativity.

BY JAMES S. RUSSELL, FAIA

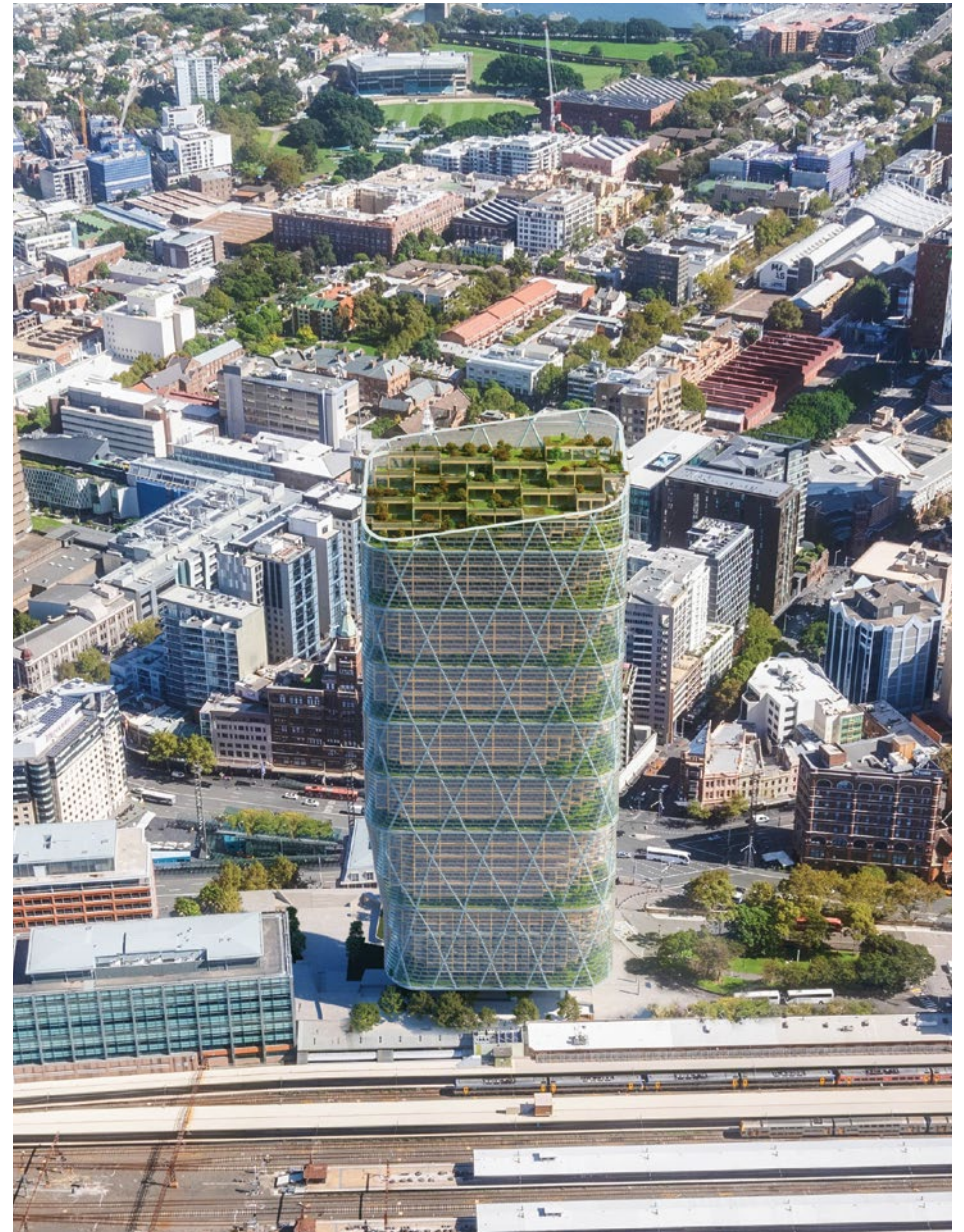
THERE'S A LOT of prognostication about the future workplace as the Covid pandemic has begun to retreat and more people are vaccinated. Organizations are examining whether their business needs demand a full return to office work, or whether they should become a fully virtual organization—given the success of remote work over the last 15 months—or whether they should deploy a hybrid strategy.

The tech giant Microsoft—heavily invested in effective computer-based work since the 1980s—has some answers, at least from the employee perspective. The company commissioned extensive workplace surveys during the pandemic, analyzing the experiences of its 160,000 global employees, and integrated the findings with research derived from a wide range of other industries. *The New Future of Work* project informs the company's approach to Teams, its virtual-meetings app that competes with the ubiquitous Zoom, as well as new products it is rolling out. It has also made this research public, and is applying the intelligence to the ambitious rebuilding of its own Redmond, Washington, campus headquarters.

The key findings can help inform the design or redesign of the physical office, as companies plan a return to at least some in-person work. The Microsoft research supports a shift toward

For software company Atlassian, in Sydney, SHoP has designed a tower (right) with multistory “neighborhoods” that rise from gardens.

IMAGES: © SHOP ARCHITECTS



**Tentlike roofs shelter Google's headquarters
in Mountain View, California, by BIG and
Heatherwick Studio**

PHOTOGRAPHY: © CHRISTOPHER MCANNENY

hybrid work, a choice the company itself has embraced. For example, in a survey of its offices in China—where buildings reopened fairly early in the pandemic—69 percent said they preferred a hybrid work model that includes a return to the office, but not a requirement that people come in every day. Only 19 percent wanted fully remote work, and only 11 percent thought everyone needed to be in the office.

Remote work, the research confirmed, presents a range of barriers for many staffers, from burnout to emotional stress and isolation. Team-based collaborative projects and creative work suffers. People miss the camaraderie of the office. Managers fear the loss of ideas generated by casual meetings and informal encounters that many office designs have fostered with numerous informal gathering areas. When RECORD asked some architects what they are hearing from clients and how they are adapting their own workspaces, their guiding ideas happened to align with many of Microsoft's findings.

Indeed, firms that adamantly resisted any remote work or



meeting via videoconference before Covid have become converts. Working from home is popular among people who want to trade the headaches of commuting for more time with their families, a consensus supported by Microsoft's research. Many noted that concentrated work was easier with fewer office interruptions—and they liked avoiding annoying coworkers.

But as the limitations of remote work have become all too evident, companies that once suggested people work permanently from home are now encouraging—or insisting—that their staffs return to the office. Besides isolation, the Microsoft

researchers found that many people struggled with fatigue and mental health issues at home, while self-reporting about productivity by those working from home was inconclusive: respondents were evenly split among those who assessed themselves as more productive and satisfied outside the office and those who reported no difference or felt less satisfied and productive. As many of us know from our own experience, many found themselves working longer hours to keep up.

Notably, women reported working through the evening to make up for time lost to parenting and household obligations, with such long days contributing to increased tensions. In one survey, 85 percent of women and 70 percent of men with childcare responsibilities fell behind in completing work tasks.

One serious deficit of remote work concerned new hires, who lacked the informal help of colleagues in getting to know people and adapting to the company culture. Managers were challenged in making sure everyone they supervised was engaged and connecting to colleagues; but at the same time, women and younger employees, as well as Black employees and others from under-represented groups, feared being overlooked for promotions because they had fewer opportunities to demonstrate their skills and talents.

Days filled with videoconferencing are extremely fatiguing, and productive disagreements were hindered by an inability to perceive body language and to gauge emotions, the researchers concluded. While companies have tried to help people connect

informally with virtual happy hours, there is as yet no app that replaces gathering around the water cooler.

In order to address some of the problems associated with virtual meetings, Microsoft has also begun to roll out “Teams rooms”—spaces in its offices that optimize interaction with an upgraded versions of its Teams app. They are intended to bring greater equity for those connecting remotely with others who are physically gathered in a meeting room.

But perhaps the biggest issue that has emerged is the hindrance to creativity and brainstorming of working remotely. Teams involved in the generation of new ideas suffered in spite of the array of virtual collaboration technology, according to the research. Those working on demanding projects missed the emotional bonds that can form, and team members “fell out of synch” with each other.

These findings are echoed in what tech companies are telling their architects. New York-based SHoP Architects’ tech clients are bringing people back to their physical locations, because “the degree to which you need people in the office has to do with how much ideation, creativity, and innovation is happening,” says Chris Sharples, a principal. “If you don’t have a lot of creative work going on”—he names insurance companies as an example—“you don’t need everyone in one place.”

Though many businesses are bringing staff back to offices by early fall, architects aren’t reporting wholesale redesigns to accommodate the post-Covid workplace yet, since uncertainties



A stair ascends through the 25 floors of NBBJ's offices for F5 Networks in Seattle.

PHOTOGRAPHY: © SEAN AIRHART/NBBJ

still abound. A rapid decline in social-distancing and mask requirements has organizations considering the end of plexiglass partitions and distanced seating. And the HVAC upgrades that a few months ago seemed essential may not be. But holdover Covid requirements may remain in place, since some jurisdictions may not permit vaccination mandates for workers. In talking with clients—especially about projects already designed but not yet built—architects are finding a change of emphasis, if not a dramatic rethinking.

In the workplace surveys, people looked to the office for everything from access to IT support to camaraderie with colleagues. So architects are asking, “What can the office provide that you can’t get at home?” as Ryan Mullenix, co-leader of NBBJ’s workplace-design practice in Seattle, puts it. Since creative and collaborative work is better in person, architects are doubling down on settings that allow informal teamwork. “We have been thinking about a hotel lobby metaphor,” says Sharples. “You encounter lounge seating, a place to huddle with your team, and pinup areas.”

Architects also can help companies understand the sociology of working together and using design to support the company’s culture. The Microsoft researchers wrote that workspaces can encourage the development of “weak ties,” the large networks

that people build with casual or occasional interactions outside their core group of colleagues. Some company cultures support these expansive networks because acquaintances become a source of ideas and problem-solving expertise.

Thus, places that ease such interaction—from stair-landing lounges and small breakout spaces next to conference rooms to coffee bars and fitness centers—are becoming part of the architect's brief. In a 44-story Seattle tower, as part of a tenant fitout project, NBBJ included an attractive stairway that opens to skyline views as it ascends through the 25 floors occupied by F5 Networks, an app-support and security company. Most elevators stop every fourth floor, encouraging people to use the stairs, where they can have serendipitous encounters and look into various team areas along the way. "You never know when the Eureka moments will happen," says NBBJ's Mullenix. "Rarely does anyone go to a conference room to innovate."

With so many people reporting stress, anxiety, and emotional exhaustion, architects are enhancing their client's spaces with more daylight, fresh air, greenery, and, where possible, views of nature. "Before the pandemic, we were hearing from tech clients about the importance of access to outdoors," says James von Klemperer, president of KPF. "Now outdoor space is a priority for the whole real-estate brokerage community." He cites the success of his firm's Hudson Commons project in Manhattan, which mounted a tower with lushly planted setbacks and balconies to an older warehouse building. That amenity was key

to attracting the fitness-machine-maker Peloton as a major tenant, he adds.

NBBJ designed a complex for REI, the outdoor-equipment retailer, in Bellevue, Washington, around a connection to nature, with garden courtyards, green roofs, windowed stairs, and a vegetable garden. Largely completed last year, the strategy made sense for a company whose customers camp and climb mountains. Much of this outdoor space is shared with the public. "Employees who need to be in the office also get to be outside," says Mullenix. "Brains are hungry for the unexpected, people-watching, zoning out." The variety of settings also serves collaborating teams and fosters casual encounters. Yet REI, fearing Covid losses, sold the building, before ever occupying it, to Facebook, which liked its amenities and was expanding its Seattle-area presence.

Meanwhile, SHoP was designing, during Covid, the 40-story headquarters for software company Atlassian in Sydney, which pointedly blurs the boundaries between outside and inside. Within an operable glass facade, supported by an exterior tubular-steel diagrid, multi-floor "villages," framed in mass timber, rise from gardens. "In these 'between spaces,' we forge natural connections with daylight and vegetation," Sharples says. "The building begins to breathe." Such healthful environments, with an abundance of fresh air, send a message about a company's commitment to its staff's well-being.

Sharples offers ideas for existing buildings, even those in

dense cities with deep floorplates and narrow windows facing dim alleys, as well as those in suburban office parks that too often subject tenants to vistas of parked cars. “Such buildings need to be adapted,” he says. “By reducing the floor plate, bringing vegetation inside, and maximizing daylight.” When all else fails, he says, advanced lighting technology can aid mental and physical health, changing across the day to support human circadian rhythms.

“The office has to be an attractive place to go,” says Florencia Kratsman, the global director of space planning for the firm BIG. “You have to do everything better, both focused work and collaboration.” As Google rethinks the way it wants to use its facilities, Kratsman expects a “comfortable transition” into three new buildings that BIG and Heatherwick Studio planned several years ago because, already, “we were very focused on health, biophilia, and sustainability,” she explains. “These projects were so large that the design had to be broken down into neighborhoods”—a scale that virus-fearing workers can find reassuring. Under monumental tentlike roofs that accommodate clerestories, natural light will be widely accessible. “There are multiple access points, and multiple vertical cores, she added, “with their own coffee machines, their own courtyards, and meeting rooms aligned with groups”—all tactics that can aid group solidarity and help people feel safe in the post-Covid workplace. Given the benign climate in Mountain View, California, where these buildings are nearing completion, “outdoor spaces



On Manhattan's far west side, KPF added a tower with planted setbacks to an existing warehouse building.

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conceived as amenity spaces will shift to working spaces post-Covid,” she notes.

With childcare a prominent source of stress for remote workers, Kratsman is also urging companies to consider on-site day care, a relative rarity in the U.S. Parents may feel more productive returning to the office if they can have ready contact with their children. “Every workplace that we are doing in Europe

and in Latin countries has a childcare component,” Kratsman observes. When European companies ask what their American counterparts do for workplace childcare, she has to answer “nothing.”

What about Microsoft, now in command of such key data about its own workers? Covid and the research came after construction had begun on an overhaul of its 520-acre Redmond campus, an initial phase to replace 14 buildings and add three more, increasing its workspace by 2.5 million square feet and adding 500,000 square feet of amenities. The new buildings are grouped around outdoor space into the company’s own version of “villages,” with design commissions divvied among four architects: NBBJ, LMN, ZGF, and WRNS.

Microsoft has altered some of the spaces within the buildings to recognize its new hybrid work style, “providing a more agile workplace that removes barriers between on-site workers and their remote colleagues,” according to the company. In addition to its new Teams-rooms technology, it has also added app-based solutions that allow staff to verify vaccination status, guide on-site workers to meeting rooms, and book a desk space for the day. These new “location-management capabilities” will enable managers to monitor and control occupancy should a new need to minimize virus movement arise.

“According to our research, the vast majority of employees say they want more flexible remote-work options,” writes Satya Nadella, Microsoft’s CEO, in a blogpost published this spring.

“They also say they want more in-person collaboration, post-pandemic.” The results reflect the aspirations for a new workplace model that offers the opportunity to innovate and work together, whether in an office shared with colleagues or remotely at home, with maximum efficiency and capacity to create. The company continues to work to reconcile what Nadella calls the “hybrid-work paradox.” ■

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Learning Objectives

- 1 Describe the post-Covid spectrum of office work, including work from home, full return to the office, and hybrid arrangements.
- 2 Explain the limitations of remote work uncovered by research.
- 3 Identify design tactics that can attract remote workers back to office settings.
- 4 Explain how office design can support collaborative, creative work.

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