

The Hidden Cost Of Summer Heat

Megan Browning, Big Ass Fans®

Heat & productivity

Industrial facilities aren't typically built with the comfort of workers as a top priority. High ceilings, large open spaces, and sizeable mechanical obstructions can make cooling manufacturing and warehousing spaces difficult. Uncomfortable working conditions lead to heat-related illnesses and decreased productivity, which negatively affect the bottom line of the business. When working conditions become distracting and debilitating to workers, personal comfort must be addressed to regain lost productivity.

Defining heat stress

Although often overlooked as a serious problem, heat stress is a condition that can result in potentially fatal heat strokes, as well as heat rash, exhaustion, and cramps. When temperatures and humidity rise, the body's ability to cool itself decreases, severely affecting worker efficiency.

According to the Center for the Built Environment, temperature and air quality are two of the most important factors when considering productivity^[1]. OSHA standards indicate temperatures of 100.4 degrees F and above are dangerous for workers, while air temperatures that exceed 95 degrees F significantly increase the heat load on the body.

Lacking productivity

Hot working conditions pose a threat not only to employee health, but also to the health of a business. Uncomfortable working conditions can eat into profits by decreasing worker productivity. Studies indicate an average 2 percent reduction in work performance per 1.8 degree F temperature rise when the temperature is above 77 degree F. While this may not seem detrimental on an individual basis, this drop in employee productivity can add up to huge profit loss across a company.

How do HVLS fans work?

HVLS fans move large volumes of air slowly and gently without creating a draft. Ranging up to 24 feet in diameter, these fans turn over air in a space several times per hour, ensuring consistent temperatures.

In applications requiring cooling, fans operate between 60 and 100 percent of maximum speed, improving comfort and productivity with an evaporative cooling effect and the added effect of heat transfer – when skin temperature is warmer than air temperature. Although fans do not lower the temperature of a space, the perceived cooling effect can make a person feel up to 10 degrees F cooler, reducing

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the likelihood of heat stress and decreased productivity. Whether air movement is used alone or in tandem with HVAC systems, the results are beneficial to all.

To see how effective HVLS fans are, consider the following: Imagine a warehouse that averages a temperature of 85 degrees F during the four months of summer. At 85 degrees F, each employee loses 8.8 percent of their productivity – if the company has 30 full-time employees each making \$15.00 per hour, the business will lose \$1,500 in lost productivity a week. The total loss in productivity per summer is then approximately \$27,000 (not including the costs of inefficient cooling and worker comp claims due to heat stress).

If air movement is incorporated into the space via HVLS fans, the warehouse will feel at least five degrees cooler – allowing the company recover about two thirds of productivity lost without the fans.

Cooling industrial spaces with HVLS fans

Adding HVAC to a facility may not always be feasible or efficient, but incorporating air movement from HVLS fans can create a cooling effect for employees working in non-conditioned spaces. Service technicians at the Continental Automotive Group in Austin, Texas were sweltering in the Texas-sized heat. With no air movement, stagnant, hot conditions depleted employee performance and morale.

“I know from personal experience, when it’s hot, you just can’t work,” said Mark Cobern, corporate health and safety director with the Continental Automotive Group. “You’re miserable.”

Several large diameter fans brought immediate relief to the technicians. Worker morale and performance increased, while the likelihood of heat-related accidents due to the lack of focus and hot working conditions was reduced.

“The fans definitely help to cool the shops off,” Cobern said. “These guys are up in the heat for so long, the fans and insulation we put in have made a 100 percent difference.”

Using HVLS in tandem with HVAC

Facilities with HVAC also benefit from HVLS fans. By gently mixing air throughout the space, these fans augment the distribution of cool air, enabling facility managers to raise their air conditioning set point without sacrificing worker comfort. The building maintains this comfort level with far less energy, equaling significant savings on utility costs.

Memphis-based Engineered Medical Systems (EMS) curves and shapes bars of steel into lifesaving medical equipment. Due to the 110 degrees F heat produced by the milling machines, air conditioning systems must run constantly. But even with the AC running year round, indoor temperatures remained unfavorable.

In lieu of adding an additional \$150,000 of AC equipment, EMS installed three 16

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foot diameter fans, which mix and circulate the conditioned air to equalize temperatures and create a cooling effect for the employees. While the business saves money by foregoing additional AC equipment, worker safety, and productivity benefits all.

EMS machinists felt the benefits of the fans and EMS Controller Charles Stanford couldn't be happier. "Now that we have the fans circulating the air, it feels a lot cooler," he said. "Before the fans, heat complaints were a daily event. Since installing the fans, I haven't heard any complaints from my employees."

Conclusion

Using high volume, low speed fans is a cost effective way to ensure worker productivity and comfort. Ideally, this leads to safer, more productive working conditions as employees can spend more time and energy on the task at hand without experiencing heat discomfort.

Megan Browning is a writer for Big Ass Fans®, a designer and manufacturer of large diameter, low speed fans.

^[1]Center for the Built Environment. "TechNotes: Productivity and IEQ Satisfaction."

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