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HUMAN HEALTH AND SAFETY THROUGH LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN

Abstract. *LEED certification provides independent, third-party verification that a building, homeor community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: location and transportation, sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.*

Keywords: *green buildings, LEED certification, sustainability, prevention through Design.*

Анотація. *У статті розглянуто переваги використання LEED сертифікації, яка забезпечує незалежну перевірку будівель за показниками якості навколишнього середовищі і безпеки життєдіяльності. Житлові і громадські будівлі необхідно проектувати і будувати з використанням технологій, спрямованих на досягнення високої ефективності в ключових сферах здоров'я людини та навколишнього середовища: вибір розташування та транспортної системи,екологічна чистота земельної ділянки, економія води, енергоефективність, вибір екологічних матеріалів і якість навколишнього середовища.*

Ключові слова: *екологічно чисте будівництво, сертифікація, сталий розвиток, проектування.*

Buildings have a substantial impact on the health and well-being of people and the planet. Buildings use resources, generate waste and are costly to maintain and operate. Green building is the practice of designing, constructing and operating buildings to maximize occupant health and productivity, use fewer resources, reduce waste and negative environmental impacts, and decrease life cycle costs. This article is aboutLeadership in Energy and Environmental Design (LEED) certification — the most prolific green building rating system in the United States and Canada.

LEED is a building certification program designed to promote energy saving in the building industry. By following the program guide-

lines, new projects have been known to generate up to 30 percent energy savings and 35 percent reduction of carbon emissions, use 30 to 50 percent less water, and generate 50 to 90 percent waste cost savings, all for only a 1 to 7 percent increase in construction costs. First implemented for new commercial construction, LEED rating systems are now in place for existing buildings, schools, retail and healthcare, as well as systems under development for laboratories.

The first version of LEED was solidified, adopted by the U.S. Green Building Council, and launched with the help of the Federal Energy Management Program in August of 1998.Canada began to incorporate the program and LEED Canada NC-1.0 was released in 2004. Canada has been ranked second in the U.S. Green Building Council's annual Top 10 Countries and Regions for LEED certified projects. LEED buildings are also designed to support Canada's climate action efforts and goals. Since 2005, LEED certified buildings have reduced over three million MT of greenhouse gases, 16.7 million MWh of energy and 30 billion litres of water.

The basis of LEED is a point system where building projects are required to fulfill all prerequisites and minimum program requirements, while LEED credits are optional. Project teams must pursue a minimum of 40 LEED points with any combination of credits of their choosing. The LEED rating systems measure performance in seven key areas: sustainable site development, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovative design, and regional priority. Collective scores in each of these key areas are used to award four levels of certification. The four levels of LEED accreditation, ranked in order are Certified, Silver, Gold and Platinum, where 40—49 points achieve LEED certification, 50—59 points are awarded silver, 60—79 points earns gold certification, and 80 points or more earns a platinum certification.

LEED Certification applies to all building types at all phases of development. Because the LEED standards are flexible enough to apply to all project types, there are unique categories called LEED Rating Systems that project teams use to organize their process and documentation for a specific building type. The LEED rating systems are grouped into five main categories: Building Design and Construction; Interior Design and Construction; Operations and Maintenance; Homes and Neighborhood Development.

Canada has embraced the LEED program in nationwide building design projects, becoming the second largest ranked country for LEED

participation in the world. 2018 saw 282 LEEDCertifications, bringing the total projects certified in Canada to 3712 by the end of the year. Of the 3712 certified projects in Canada, 1396 are in Ontario. The LEED program is one of several sustainability programs included in GBCI Canada. Jointly owned by the Canada Green Building Council (CaGBC) and Green Business Certification Inc. (GBCI), GBCI Canada accelerates green building market transformation and impact in Canada. GBCI Canada exclusively administers project certifications, professional credentials and certificates within the framework of the LEED green building rating systems.

LEED has transformed the design, construction, operations and maintenance industry in Canada and the US, increasing property value, reducing day-to day costs, reducing environmental impacts and improving human health, and the program aims to continue to push the sustainability dial further. LEED is revolutionizing the way buildings are constructed in Canada and US. However, as the building industry moves forward into a new era, are workers rights and safety being properly considered? How could such a leap affect the health and safety of construction workers?

The Identification of Safety Risks for High-Performance Sustainable Construction Projects study looked into construction projects with LEEDcertification. In the study, dozens of designers and contractors were interviewed, each with an average of 100 traditional construction jobs and about four LEED jobs. Out of the results, 12 LEED guidelines lead to an increase in safety risk compared to non-LEED.

Many of the problems have to do with height coupled with unfamiliar, new technology. The high-risk tasks include constructing atria and installing solar panels, attributing to a 24 percent increase in falls.

There are also more electrical currents near unstable soils and an increased use of heavy equipment on LEED projects. Even wastewater technologies have about 14 percent more exposure to harmful substances.

The Bureau of Labor and Statistics also conducted the Occupational Employment Statistics, or OES, survey. Along with the O*NET green occupational categories, about 90 percent of the construction workforce is now employed in green-related industries. Again, the increased risk of falls is a big factor when dealing with solar or wind power, as well as skylights or atriums. They also found extra exposure to hazardous materials because of weatherization.

Although LEED's push for greener, more sustainable buildings is commendable, with new evidence of injury risks to workers at LEED

sites, theGreen Building Council must consider new safety guidelines.United States Green Building Council added a new «pilot credit» for Prevention through Design to its Leadership in Energy and Environmental Design LEED rating system. The credit encourages early consideration of occupational safety and health issues throughout a building's life cycle.

Prevention through Design is a National Institute of Occupational Safety and Health's effort to prevent or reduce occupational injuries, illnesses, and fatalities through inclusion of prevention considerations in all designs that affect workers. The integration of Prevention through Design with LEED, a certification system for green buildings, arose from a National Institute of Occupational Safety and Health andUnited States Green Building Council partnership to explore connections between occupational safety and health issues and sustainable building practices.

United States Green Building Council tests new concepts for possible integration into LEED through the use of pilot credits, according to the organization's website. Project teams seeking LEED certification are encouraged to try to meet the criteria specified in pilot credits and are asked to provide feedback on those criteria. USGBC uses the feedback to refine the pilot credits and submits successful credits to a vote of its membership for final inclusion in LEED.

For Prevention through Design to be more broadly adopted as part of sustainable construction, practice and research opportunities (grants and funding) which include architects and designers and allow them to take the lead in Prevention through Design and own rights to the processes involved should be considered. The concept should also be included as part of the Integrative Process credit rather than a standalone credit. Higher order controls are more likely to be identified during the design phase compared to the construction phase.

Currently Leadership in Energy and Environmental Design is the world's most widely used green building rating system with more than 94,000 projects participating in 167 countries and territories. In addition to focusing on strategies that help address climate change, LEED prioritizes actions that promote the health and wellbeing of the people within buildings and spaces.

According to a 2018 survey released by the United States Green Building Council, employees who work in LEED-certified green buildings are happier, healthier and more productive than employees in conventional and non-LEED buildings. The survey also shows that a

majority of office workers want to work for companies that are value-oriented, take stances on important issues like sustainability, and do their part for making a positive difference in the world. In fact, 84 percent of respondents prefer to work for a company that has a strong, concrete mission and positive values.

LEED buildings are linked to improved productivity, health and wellness, and the survey showed that these attributes, as well as a space that provides clean and high-quality indoor air, directly contribute to employees feeling happy and fulfilled at work. More than 80 percent of respondents say that being productive on the job and having access to clean, high-quality indoor air contributes to their overall workplace happiness.

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