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Green Building Design and Construction Using Concept of Sustainability

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ABSTRACT

Sustainable architecture (HQE in France, Green Buildings in the USA, Sustainable Buildings in Northern Europe) is a profound initiative whose objective is to achieve sustainability of buildings. This concept has spread throughout the world and each country worked to develop its approach (depending upon its physical and cultural conditions) to minimize the negative impacts of buildings on the natural environment and improving the comfort and quality of life. These international initiatives are characterized by multi-criteria vision, contextuality, flexibility and scalability. What strategies should be developed for sustainable building in Annaba? This is the fundamental question for which we try to provide some answers by doing Numerous researches focused on the global warming. Initial efforts on understanding the factors and the causes of it contributed to propose solutions and mitigation strategies in a prototype of a designed green building.

We are also interested on how vegetation and green envelope contribute to reducing the effect of global warming and improving the outdoor thermal comfort. two different scenarios are designed to simulate the role of vegetation elements such as trees, grass, and green roofs. The simulation was performed on the hottest day in summer and the coldest day in winter. The mean radiant temperature, relative humidity, PMV, and wind speed distributions have been analyzed using the software ENVI-met.

Key Words: innovation, green building, global warming, green envelope, vegetation, sustainability, bioclimatic architecture.

RESUME

L'architecture durable (HQE en France, Green Buildings aux USA, Sustainable Buildings en Europe du Nord) est une initiative profonde dont l'objectif est d'atteindre la durabilité des bâtiments. Ce concept s'est répandu dans le monde entier et chaque pays a travaillé à développer son approche (en fonction de ses conditions physiques et culturelles) pour minimiser les impacts négatifs des bâtiments sur l'environnement naturel et améliorer le confort et la qualité de vie. Ces initiatives internationales se caractérisent par une vision multicritère, une contextualité, une flexibilité et une évolutivité. Quelles stratégies développer pour la construction durable à Annaba ? C'est la question fondamentale à laquelle nous essayons d'apporter des réponses en faisant de nombreuses recherches axées sur le réchauffement climatique. Les premiers efforts pour comprendre les facteurs et les causes de celui-ci ont contribué à proposer des solutions et des stratégies d'atténuation dans un prototype de bâtiment écologique conçu.

Nous nous intéressons également à la manière dont la végétation et l'enveloppe verte contribuent à réduire l'effet du réchauffement climatique et à améliorer le confort thermique extérieur. Deux scénarios différents sont conçus pour simuler le rôle des éléments de la végétation tels que les arbres, l'herbe et les toits verts. La simulation a été réalisée le jour le plus chaud en été et le jour le plus froid en hiver. Les distributions moyennes de température radiante, d'humidité relative, de PMV et de vitesse du vent ont été analysées à l'aide du logiciel ENVI-met.

Mots clés : innovation, green building, réchauffement climatique, enveloppe verte, végétation, durabilité, architecture bioclimatique.

ملخص

الهندسة المعمارية المستدامة (HQE) في فرنسا ، المباني الخضراء في الولايات المتحدة الأمريكية ، المباني المستدامة في شمال أوروبا (هي مبادرة عميقة هدفها تحقيق استدامة المباني. انتشر هذا المفهوم في جميع أنحاء العالم وعملت كل دولة على تطوير نهجها (اعتمادًا على ظروفها المادية والثقافية) لتقليل الآثار السلبية للمباني على البيئة الطبيعية وتحسين الراحة ونوعية الحياة. تتميز هذه المبادرات الدولية برؤية متعددة المعايير والسياق والمرونة وقابلية التوسع. ما هي الاستراتيجيات التي يجب تطويرها للبناء المستدام في عناية؟ هذا هو السؤال الأساسي الذي نحاول تقديم بعض الإجابات عنه من خلال إجراء العديد من الأبحاث التي تركز على ظاهرة الاحتباس الحراري. ساهمت الجهود الأولية لفهم العوامل والأسباب وراء ذلك في اقتراح الحلول واستراتيجيات التخفيف في نموذج أولي لمبنى أخضر مصمم.

نحن مهتمون أيضًا بكيفية مساهمة الغطاء النباتي و الغلاف الأخضر في تقليل تأثير الاحتباس الحراري وتحسين الراحة الحرارية الخارجية. تم تصميم سيناريوين مختلفين لمحاكاة دور عناصر الغطاء النباتي مثل الأشجار والعشب والأسطح الخضراء. تم إجراء المحاكاة في أكثر الأيام حرارة في الصيف وأبرد يوم في الشتاء. تم تحليل متوسط درجة الحرارة المشعة والرطوبة النسبية وتوزيعات PMV وسرعة الرياح باستخدام البرنامج ENVI-met.

الكلمات المفتاحية: الابتكار، المباني الخضراء، الاحتباس الحراري، الغلاف الأخضر، الغطاء النباتي، الاستدامة، العمارة المناخية.

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