International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

Dolna 17, Warsaw,
Poland 00-773
+48 226 0 227 03
editorial_office@rsglobal.pl

ARTICLE TITLE	THE NECESSITY OF REVISING ALGERIAN URBAN PLANNING REGULATIONS TO MEET USERS' THERMAL COMFORT NEEDS: INTEGRATING THERMAL COMFORT AS A REQUIREMENT IN BUILDING PERMIT APPLICATIONS - A CASE STUDY
ARTICLE INFO	Toumi Fahmi, Tartar Nassima. (2024) The Necessity of Revising Algerian Urban Planning Regulations to Meet Users' Thermal Comfort Needs: Integrating Thermal Comfort as a Requirement in Building Permit Applications - A Case Study. *International Journal of Innovative Technologies in Social Science*. 4(44). doi: 10.31435/ijitss.4(44).2024.3061
DOI	https://doi.org/10.31435/ijitss.4(44).2024.3061
RECEIVED	22 November 2024
ACCEPTED	27 December 2024
PUBLISHED	30 December 2024
LICENSE	The article is licensed under a **Creative Commons Attribution 4.0 International License.**

THE NECESSITY OF REVISING ALGERIAN URBAN PLANNING REGULATIONS TO MEET USERS' THERMAL COMFORT NEEDS: INTEGRATING THERMAL COMFORT AS A REQUIREMENT IN BUILDING PERMIT APPLICATIONS - A CASE STUDY

Toumi Fahmi
University Echahid Echeikh Larbi Tebessi Tebessa, Algeria.
Laboratory Architecture, City and Environment, University Hassiba Ben Bouali Chlef.

Tartar Nassima
University Echahid Echeikh Larbi Tebessi Tebessa, Algeria.
Laboratory Architecture, City and Environment, University Hassiba Ben Bouali Chlef.

ABSTRACT

The article addresses the importance of updating Algerian urban planning legislation to include thermal comfort standards in buildings, particularly in light of Executive Decree No. 15-19. Although this decree focuses on the engineering and administrative aspects of construction, it overlooks thermal comfort standards that ensure a comfortable and healthy environment for residents. According to international standards such as ISO 7730, details about temperature, humidity, and ventilation should be included in the design stages to ensure thermal comfort. However, Algerian legislation lacks these standards, leading to uncomfortable environments inside buildings. The article recommends amending the executive decree to incorporate thermal comfort standards into the building permit procedures, with the need to train architects and designers on applying these standards. Legislative updates will improve the quality of life in buildings and enhance their energy efficiency, contributing to their sustainability.

KEYWORDS

Thermal Comfort, Urban Planning Legislation, Energy Efficiency

CITATION

Toumi Fahmi, Tartar Nassima. (2024) The Necessity of Revising Algerian Urban Planning Regulations to Meet Users' Thermal Comfort Needs: Integrating Thermal Comfort as a Requirement in Building Permit Applications - A Case Study. *International Journal of Innovative Technologies in Social Science*. 4(44). doi: 10.31435/ijitss.4(44).2024.3061

INTRODUCTION.

Thermal comfort is considered one of the fundamental elements in the design of modern buildings, where a dynamic balance must be achieved to use minimal resources while ensuring maximum comfort for the occupants (Rapoport, 1973). In this context, the construction sector is the largest energy consumer globally, accounting for approximately 40% of total energy consumption and 36% of carbon dioxide emissions (Hasan, Defer, & Shahrour, 2014). A significant portion of this consumption is directed towards enhancing thermal comfort within buildings, focusing on improving airflow, controlling solar energy flow, and aligning with the daily rhythms of users. Moreover, architectural design plays a crucial role in creating an intelligent building envelope that interacts with the surrounding environment and enhances the comfort of the inhabitants (Saïd El-Sheimi, 2011). Therefore, thermal comfort can be considered a mental state that reflects individuals' satisfaction with their indoor environment (Lavoye & Thellier, 2008).

In Algeria, Law 90-29, dated December 1, 1990, concerning urban planning and development (JORADP, 1990), serves as the primary reference for the various mechanisms and contracts related to urban planning and the general rules for development in Algeria. The executive decree No. 15-19, dated January 25, 2015, is the main reference that regulates the procedures for preparing urban planning contracts and building permits (JORADP, 2015). Despite the growing importance of thermal comfort in buildings, this decree does not clearly address how thermal comfort standards should be incorporated into building permit requirements. In contrast, the international standard ISO 7730 provides precise guidelines on how to achieve thermal comfort within buildings by specifying optimal temperatures, relative humidity, and appropriate ventilation to ensure a healthy and comfortable indoor environment (ISO 7730, 2005). Therefore, this research aims to explore the status of thermal comfort within Algerian legislation related to building permits, according to Executive Decree No. 15-19, and discuss ways to integrate standards such as ISO 7730 into legal procedures related to construction in Algeria.

MATERIALS AND METHODS.

An analytical research methodology was used to study Executive Decree No. 15-19, along with global thermal comfort standards. The required documents for obtaining building permits were analyzed, with a focus on the sections dealing with engineering and technical files. Legal practices in Algeria were compared with the international standard ISO 7730, which focuses on the study of thermal comfort in buildings. Data was collected through the examination of local legislation and interviews with experts in the fields of construction and architectural engineering.

RESULTS.

The analysis of Executive Decree No. 15-19, dated January 25, 2015, in the context of thermal comfort standards in building permits in Algeria revealed the following key findings:

1. Lack of Direct Inclusion of Thermal Comfort**:** Although Executive Decree No. 15-19 primarily focuses on administrative and engineering aspects of construction, such as site plans and building layouts, other legislation requires certain conditions to be met before granting a building permit. Notably, Law No. 03-10, dated July 19, 2003, concerning environmental protection within the framework of sustainable development (JORADP, 2003), mandates conducting an environmental impact study or providing an impact summary before undertaking development projects, industrial installations, or construction programs that may directly or indirectly affect the environment. However, this legislation does not include specific standards related to thermal comfort, such as temperature, humidity levels, or ventilation quality within buildings.
2. Building Requirements, But No Focus on Thermal Comfort**:** The decree requires applicants for building permits to provide details on the structural design, materials used, and facilities such as electricity, water, and ventilation. However, no standards are specified regarding the control of indoor climate or ensuring thermal comfort for the individuals within the buildings.
3. Absence of International Standards in Local Legislation**:** A comparison between local practices in Algeria and the international standard ISO 7730, which specifies thermal comfort standards within buildings, revealed that local legislation does not fully adhere to or incorporate the necessary guidelines for providing thermal comfort according to the international standard. This reflects a clear gap between local and international standards.
4. Impact of Administrative Procedures on Thermal Comfort Standards Implementation**:** In the building permit application process, documents are submitted to local authorities (municipal councils or regional administrations) for approval. However, there is no indication of thermal comfort standards being examined as part of these procedures. This means that thermal comfort factors are not part of the routine assessment conducted during this process.
5. Technical Files and Building Details: Although the decree requires technical files that include details about electrical systems, ventilation, and heating, it does not specify how thermal comfort should be ensured through these systems. Additionally, there are no mechanisms defined for regulating temperature or humidity in accordance with international thermal comfort standards.

The findings indicate a significant gap between local standards in Algeria and international standards such as ISO 7730 regarding thermal comfort within buildings. While Executive Decree No. 15-19 focuses on engineering and administrative aspects, it does not address thermal comfort standards specifically, leading to uncomfortable living environments for residents. Therefore, Algerian legislation requires modification to

incorporate thermal comfort standards into the building permit process, which would improve the quality of life in buildings and enhance their energy efficiency in line with international standards.

DISCUSSION

The results of the analysis highlight a significant gap between local legislation in Algeria, as represented by Executive Decree No. 15-19, dated January 25, 2015, and international standards related to thermal comfort in buildings, such as ISO 7730. This indicates an urgent need for Algeria to review and integrate these standards into its building permit regulations to ensure both occupant comfort and building efficiency.

1. The Gap Between Local Legislation and International Standards: ISO 7730 specifies the exact standards required for thermal comfort within buildings, such as optimal temperatures, relative humidity, and ventilation. However, the Algerian decree does not explicitly address these factors, as it focuses on structural and engineering aspects without considering thermal comfort standards, which are a core component of indoor environmental quality. While ISO 7730 calls for the inclusion of systems for controlling temperature, humidity, ventilation, and daylight in the design standards, the Algerian decree addresses these factors in a cursory manner and does not specify mechanisms for their implementation. This means that buildings in Algeria may not comply with the minimum international standards for thermal comfort.

2. Lack of Inclusion of Thermal Standards in the Design Phase: The Algerian executive decree requires building permit applicants to submit a range of engineering and administrative plans, including space layouts and the selection of materials. However, it does not require the submission of any studies or plans related to thermal comfort, such as calculations for temperature, humidity, or building ventilation analyses. In contrast, ISO 7730 emphasizes the necessity of incorporating these standards during the early design phase to ensure user comfort. The standard also highlights the importance of using appropriate air conditioning systems and ensuring balanced heat distribution within the building, which is not addressed by the Algerian decree.

3. Potential Impact on Health and Comfort: The failure to incorporate thermal comfort standards could lead to the creation of uncomfortable or unhealthy environments within buildings. For example, high temperatures or humidity in Algeria's hot summers could result in heat stress or discomfort inside buildings. In contrast, international standards such as ISO 7730 provide a scientific framework for measuring and achieving a suitable indoor environment, contributing to improved productivity and protecting individuals' health.

4. Challenges Associated with Implementing International Standards: One challenge that Algeria may face in adopting ISO 7730 standards is the need to train engineering and construction professionals on how to apply these standards effectively. Additionally, the gap in infrastructure and the lack of technology required to measure and analyze thermal comfort within buildings may present another obstacle. Moreover, there is a need to develop legislative policies that enforce these standards at the municipal and regional levels to ensure that new projects meet international thermal comfort requirements.

5. Future Opportunities for Improving Legislation: Based on the findings of this research, it is recommended that Executive Decree No. 15-19 be amended to officially incorporate thermal comfort standards in line with ISO 7730. For example, the decree should require the submission of thermal comfort studies when applying for building permits, and mechanisms should be established to measure and evaluate the internal environmental conditions of buildings. Furthermore, awareness of the importance of thermal comfort should be included in the educational and training curricula for architects and designers, in addition to developing precise evaluation tools that consider temperature, humidity, and ventilation during the design process.

In light of the comparison between local practices in Algeria and ISO 7730, it is clear that Algerian legislation needs substantial updates to fully adopt thermal comfort standards. Such a change would improve the indoor environment of buildings in Algeria, enhancing residents' well-being and demonstrating the country's commitment to international standards.

CONCLUSIONS

In light of the findings, it is evident that there is an urgent need to update Algerian legislation related to building permits to ensure alignment with international thermal comfort standards in buildings, such as ISO 7730. While Executive Decree No. 15-19 provides clear requirements for the engineering and administrative aspects of construction, it does not address the necessary standards for achieving thermal comfort, creating a significant gap between local practices and international standards.

Incorporating thermal comfort standards into Algerian legislation would improve the living environment within buildings, contributing to a higher quality of life for residents and reducing energy consumption. This would require legal amendments to include requirements related to calculations for temperature, humidity,

ventilation, and other factors affecting occupant comfort (OMS, 2020). Furthermore, it is essential to provide specialized training for architects and designers on how to effectively apply these standards to ensure their successful implementation.

In conclusion, legislative updates are a necessary step toward improving the quality of the built environment in Algeria, ensuring occupant comfort, and keeping pace with global developments in building sustainability and energy efficiency.

REFERENCES

1. Lavoye, F., & Thellier, F. (2008). *Le confort thermique dans les bâtiments* [Technical Report]. IMT Mines Alès.
2. Saïd El-Sheimi, I. A. H. (2011). Le rôle de la technologie de construction dans l'atteinte du confort thermique des espaces architecturaux. *Journal of the Egyptian Society of Engineers, 50*(2).
3. Rapoport, A. (1973). *House form and culture* (p. 116). Prentice-Hall.
4. Hasan, O. A., Defer, D., & Shahrour, I. (2014). A simplified building thermal model for the optimization of energy consumption: Use of a random number generator. *Energy and Buildings, 82*, 322–329. https://doi.org/10.1016/j.enbuild.2014.07.023
5. Delgarm, N., Sajadi, B., & Delgarm, S. (2016). Multi-objective optimization of building energy performance and indoor thermal comfort: A new method using artificial bee colony (ABC). *Energy and Buildings, 131*, 42-53. DOI: 10.1016/j.enbuild.2013.08.024
6. Journal officiel de la République algérienne. (2015). *Décret exécutif n° 15-19 du 25 janvier 2015 fixant les modalités d'instruction et de délivrance des actes d'urbanisme*, n° 7, 12 février 2015.
7. ISO 7730. (2005). *Ergonomics of the thermal environment – Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria*. International Organization for Standardization.
8. Journal officiel de la République algérienne. (1990). *Loi n° 90-29 du 01 décembre 1990 relative à l'aménagement et à l'urbanisme.* n° 52, 02 décembre 1990.
9. Journal officiel de la République algérienne. (2003). *Loi n° 03-10 du 19 juillet 2003 relative à la protection de l'environnement dans le cadre du développement durable*. n° 43, p. 6. Modifiée par des dispositions ultérieures.
10. Organisation mondiale de la santé. (2020). *Guide des normes de qualité de l'air et de confort thermique dans les bâtiments.* Genève : Organisation mondiale de la santé. Récupéré de https://www.who.int/publications