PROCEEDINGS of the
23rd International Congress on Acoustics

9 to 13 September 2019 in Aachen, Germany

Acoustic regulation in hospitals – Interior acoustics improving the recovery of patients

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ABSTRACT

Busy environments are bound to be noisy, and hospitals are no exception. The rampant noise found in modern hospitals are caused by a variety of sources; including patients, staff and medical alerts, making hospitals unable to meet the desired acoustic levels recommended for recovery.
Evidence-Based Design can reduce treatment times, the consumption of medication by patients, as well as create an environment that supports better sleeping patterns and calmness. For example, a study of 416 patients has shown that quieter environments can reduce hospitalization periods.
Major European countries, such as NL and IT, still miss acoustic regulations for the healthcare sector. Other countries, such as FR, DE, ES, PL, FI, UK and the Scandinavian countries, have specific regulation for hospitals in place.
The presentation will analyze the particulars of the acoustic requirements in 9 European countries. In addition, the discussion will get initiated on what a meaningful "common denominator" looks like for countries with neither interior acoustic guidance nor regulations in place.

Keywords: Hospitals, Regulation, Room acoustics

INTRODUCTION

The requirements and guidance for room acoustics in hospitals in Europe vary by which technical parameter is used, by the stringency of a given parameter, and by the area of the hospital, which is governed depending on the use of the different room types.

When analyzing the technical parameters used, for example, in patient rooms a reverberation time is used in DK, FI, FR, NO, and SE. The reverberation times range from 0,5 seconds, for a class C patient room according to the Swedish standard, to 0,8 seconds in FI, FR and PL. ES and DE use the relation of an absorption area in a room, to the volume of the room, and the UK used the relation of absorption area to floor area.

The compartmentalization of hospitals also differs. For example, the French order from 2003, on the limitation of noise in healthcare facilities, differentiates between staff rooms, patient rooms, examination rooms, treatment rooms, offices, canteens, hallways, lobbies and any other room with a volume between 250 to 512 m^3, as well as rooms with a larger volume than 512 m^3.

An overview of sound absorption requirements and guidance specific for patient rooms in hospitals is given in table 1. The overview does not include other parameters that might be required in the given countries, such as a speech transmission index (STI), above 0,6 in Finland, and the various classes in certain countries. For example, in Norway and Sweden, the referred standards include sound quality classes A to D. A class A is equivalent to an especially good sound climate, where a class C rating is acceptable for the average person. The values in table 1 are the requirements to achieve a class C rating in a room.

In table 1, the "A" represents the absorption area of the room in m^2, the "FA" represents the floor area of the room in m^2, the "V" represents the room volume in m^3 and "RT" the reverberation time.

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Table 1 – Overview of requirements and guidance specific for patient rooms in hospitals

Country	Denmark (1)	England (2)	Germany (3)	Finland (4)	France (5)	Norway (6)	Poland (7)	Spain (8)	Sweden (9)
Requirements/guidance for patient rooms	RT <0,6s	A/FA >0,8	A/V >0,25	RT < 0,8s	RT <0,8s	RT <0,6s	RT <0,8s	A/V >0,2	RT <0,5s

DISCUSSION

The presentation will analyze the commonalities and difference of the acoustic requirements between these 9 European countries. Afterwards, a first conclusion is drawn what a meaningful "common denominator" could be for countries with neither interior acoustic guidance, nor an acoustic regulation in place. This serves as input for the discussion after the presentation.

For countries with requirements in place, a common reference can lead to more alignment over time. An example of a great first step in this area for residential building is ISO TS 19488 - Acoustic classification of dwellings, by ISO technical committee 43 working group 29.

REFERENCES

1. Denmark, Building regulation/Bygningsreglementet 2018 (BR18), http://bygningsreglementet.dk/Tekniske-bestemmelser/17/Vejledninger/Hospitaler-laegehuse-og-klinikker
2. England, Department of Health, TDM 4032:06 Room Acoustics (this replaced "Health Technical Memorandum (HTM) 08-01)
3. Germany, German Standard DIN 18041:2016-03 Acoustic quality in rooms – Specifications and instructions for the room acoustic design (room type B3)
4. Finland, 796/2017 Decree of the Ministry of the Environment on the Acoustic Environment of Buildings, https://www.ym.fi/en-US/Land_use_and_building/Legislation_and_instructions/The_National_Building_Code_of_Finland/Noise_abatement_and_noise_conditions
5. France, Order of 25 April 2003 on the limitation of noise in health facilities Arrêté du 25 Avril 2003 relatif à la limitation du bruit dans les établissements de santé https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=LEGITEXT000005634432
6. Norway, Building regulation/Byggteknisk forskrift (TEK17) refers to Norwegian Standard NS 8175:2012 Acoustic conditions in buildings – Sound classification of various types of buildings
7. Poland, Directive for Infrastructure and Buildings from 14 Nov. 2017 refers to standard PN-B-02151-4: 2015-06: Building acoustics
8. Spain, Basic Document Protection against noise/Documento Básico HR, Protección frente al ruido, 2009, https://www.codigotecnico.org/images/stories/pdf/proteccionRuido/DBHR.pdf
9. Sweden, Building regulation/Boverkets byggregler (BBR, BFS 2015:3) refers to standard SS 25268:2007+T1:2017 Acoustics - Sound classification of spaces in buildings - Institutional premises, rooms for education, preschools and leisure-time centres, rooms for office work and hotels