Regulation for control of sound exposure in entertainment venues

Case studies from Belgium, France and Switzerland

Make Listening Safe
WHO

This document summarizes the Belgian, French and Swiss regulations for control of sound exposure in entertainment venues. The case studies will be used for the development of a WHO regulatory framework for control of sound exposure in entertainment venues. The document has been prepared by WHO with the help of Mr Mark Laureyns, President of the European Association of Hearing Aid Professionals; Mr Didier Ollandini and Ms. Marie Fiori, Ministry of Solidarity and Health, France; Mr. Jean-Louis Horvilleur, President of the Scientific Council Bruitparif; and Mr Raphael Elmiger, Federal Office of Public Health, Switzerland.

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Background

Hearing loss affects millions of people around the world. One of the key contributors to hearing loss is recreational loud sounds. More and more young people are at high risk of hearing loss due to exposure to loud sounds in recreational settings, such as bars, discotheques, clubs or sports events. Such hearing loss is of concern as it is irreversible, while being preventable through safe listening. WHO has initiated a process of developing a regulatory framework for control of sound exposure in recreational settings. As a first step, a systematic review was carried out to explore existing country legislations, regulations, and policies to protect patrons' hearing in entertainment venues. The review identified Belgium, France and Switzerland as three of the countries with the most comprehensive regulations. This document presents in brief the components, strengths and weaknesses of the regulations in these countries. The information presented in this document will be used as a resource for the development of the WHO regulatory framework for control of sound exposure in recreational settings.

Belgium

History

On February 24, 1977 the Belgian government issued the first Royal Decree specifying sound standards for public and private establishments (KB 1977). Indoor and outdoor events were subject to the regulations which protected the exposure of attendees as well as the exposure of neighbors. The decree established a maximum sound pressure level of 90 dB(A) for public events. Overall, evidence shows that the regulations have not been adhered to regularly[1], and the sound limit of 90 dB(A) has been considered too low from the music industry. Therefore, the decree has been slightly modified for the Walloon Region of Belgium, whereas new regulations have been established in Flanders and in Brussels[2].

Flanders

A public debate was initiated in 2009 in Flanders following increasing reports of hearing damage among young people attending music events. In addition, the University of Ghent published series of articles[3] on the effects of recreational noise exposure and the attitudes and beliefs of young people towards noise. This escalating concern led to an extensive consultation with representatives from the music industry (technicians, organizers), healthcare specialists (audiologists, organizations), environmental experts (noise experts, local authorities), civil society and public services. The results of the consultation and an analysis of existing foreign regulations served as a basis for the process of development of new decree. After two years of intensive preparation, on 17 February 2012 the Flemish government amended the Royal Decree of 1977, issuing new noise standards for entertainment activities[4]. The regulations were repealed in 2014[5].

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[1] Van Ranst S, 2012 - Kritische evaluatie nieuwe geluidsnormen voor muziekevenementen. Gent: Universiteit Gent; 2012. http://vibeserver.net/scripties/kritische%20evaluatie%20nieuwe%20geluidsnormen.pdf

[2]https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/shc_9332_advice_tinnitus.pdf

[3] Keppler, Hannah, Ingeborg Dhooge, and Bart Vinck. "Hearing in young adults. Part II: The effects of recreational noise exposure." Noise & health 17.78 (2015): 245.
Keppler, Hannah, Ingeborg Dhooge, and Bart Vinck. "Hearing in young adults. Part I: The effects of attitudes and beliefs toward noise, hearing loss, and hearing protector devices." Noise & health 17.78 (2015): 237.

[4] https://navigator.emis.vito.be/mijn-navigator?woId=9487

Brussels

Bruxelles Environnement, the public service responsible for the environment and energy at the Brussels Region, carried out a study showing that only 21% of participants who attend loud sound venues use hearing protection, and 56% of the attendees go to music events with children without taking any special protection measures[6]. In addition, the study showed that 28% of the participants are actually bothered by the volume of the music at events, and 4 out of 10 have experienced ear pain as a result of the amplified music. One third of the participants have left a music event due to the high sound levels. After a consultation with experts from the health sector, the cultural sector, sound engineers and acoustics experts, the Brussels Government issued a new decree on 26 January 2017 establishing regulations for broadcasting electronically amplified sounds in recreational venues open to the public (BM 21/02/2017). The regulations entered into force on 21 February 2018[7]. Brussels regulations are similar to those of Flanders but with some substantial differences.

Summary of regulations

Flanders

The regulations in Flanders are part of the Decree concerning Environmental Licenses VLAREM33 and apply to all public establishments and events with amplified music, with major focus on big venues, festivals and concerts[8]. According to the regulations, there are three types of events:

1. $L_{Aeq,15min}$ is less than 85 dB(A). In this case no requirements with respect to sound exposure are specified, and no authorization or licenses required.
2. > 85 dB(A) $L_{Aeq,15\ min}$ and < 95 dB(A) $L_{Aeq,15\ min}$. For indoor venues with more than twelve music activities a year, with sound levels exceeding 85 dB(A) but not 95 dB(A), organizers

[5]https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/shc_9332_advice_tinnitus.pdf
[6] Bruxelles Environnement. 2019. Amplified sound: Conditions for the broadcasting of electronically amplified sound in public venues. Authorizations and partnerships division.
[7] http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2017012632&table_name=loi
[8] Pee, G and Vindevogel, G. 2015. Noise standards for electronically amplified music in Flanders (Belgium). EAA-NAG-ABAV

need to obtain class 3 license from the municipal government. Also, the equivalent sound level should be measured and be visible for the person who is responsible for regulating the sound volume. The measurement should be done throughout the whole event and taken at the mixing console or other representative measurement point. In rare cases, an event organizer can apply for authorization to exceed the maximum sound level for a short duration of time (maximum of three hours a day), but never exceeding 100 dB(A) $L_{Aeq,60\ min}$.

3. > 95 dB(A) $L_{Aeq,15\ min}$ and < 100 dB(A) $L_{Aeq,60\ min}$. For such events, a class 2 full environmental license is required. As in category 2, the equivalent sound level should be measured and be visible for the person who is responsible for regulating the sound volume. The measurement should be done throughout the whole event and taken at the mixing console or other representative measurement point. A maximum peak level of 102dB(A) $L_{Aeq,\ 15\ min}$ cannot be exceeded. The measured sound levels should be recorded in case later inspection by the authorities is demanded.

Sound levels

As an exposure of 85 dB(A) for eight hours a day is not feasible for all recreational activities, it was adopted only as a maximum sound level for events that do not require specific authorization or license. The sound level limits of the other two categories were determined based on existing foreign regulations and legislations, as well as on the ISO sound standards for the industry. In addition, an average time of 15 L_{Aeq} is determined for all categories except the last one where the average time is 60 minutes, because live performances which normally fall within the third category require sufficient dynamic through the activity, which can be ensured only through a longer assessment. The other reason for choosing 15 L_{Aeq} is to facilitate the enforcement measurement of the authorities.

dB(A) versus dB(C)

During the preparation of the regulations, average C-weighted sound pressure level was discussed but not chosen, because of three reasons:

- lack of evidence
- the fact that the higher frequencies (dB(A) typically lead to hearing damage rather than the low frequencies (dB(C), which cause mainly nuisance in the neighborhood.

- Overcomplication for organizers in terms of technical demands and enforcers' equipment

Sound measurement

The regulation sets a standard for measuring noise levels, as all measuring devices need to meet or exceed the requirements of the IEC 61672 standard for class 2 sound level meters[9]. There is no standard guidance on where the sound measurement should take place. However, it is recommended that the measurement should be at a "representative" place in the room, i.e. at a place where the volume corresponds to the average volumes. In addition, it is suggested that the measurement should take place no closer than 1 meter of sound sources. In that case, the organizer also bears the responsibility to ensure that, as technically possible, the public is also kept at least 1 meter away from the sound sources.

Noise plan

The event organizer should prepare a noise plan to optimize the noise level in the establishment in the case of permanent sound installations that belong to the establishment. The noise plan must contain at least the following information:

1) the optimum arrangement and choice of speakers taking into account the most efficient possible distribution of sound;

2) the measuring location;

3) the noise level at the measurement site and at least four other assessment sites;

4) the place where the noise level is regulated;

5) the floor plan of the entire space that is accessible to the public.

The noise plan is drawn up by an environmental expert who is recognized in the noise and vibrations discipline. The noise plan is present in the establishment and is available for inspection by the supervisory authority.

Information to participants

In Flanders, the measuring instrument which shows the sound levels in the venue does not have to be visible to the public but only to the person responsible for the sound

[9] Electroacoustics – Sound level meters. IEC 61672. International electrotechnical commission. 2003

Hearing protection

During music activities where the maximum noise level is> 95dB (A) LAeq, 15min and ≤ 100 dB (A) LAeq, 60min, the organizer is obliged to offer visitors hearing protection free of charge. It is not mandatory to give each visitor a set of earplugs upon arrival. Visitors who wish to do so must have access to it (for example, offered in a vending machine). For music activities> 85dB (A) LAeq, 15min and ≤ 95 dB (A) LAeq, 15min, this measure is not mandatory but is recommended.

No further requirements are imposed for the earplugs. The organizer can choose the type of earplugs he wishes to offer. When choosing earplugs, it is suggested that one can pay attention whether the packaging refers to standard EN 352-2: 2002. If this standard is mentioned, this means that the earplugs have been tested in the manner prescribed in the standard and that they meet a number of minimum requirements with regard to attenuation.

Rest areas

The regulation in Flanders does not require from venue owners the provision of a rest area for attendees of music events.

Brussels

Brussels regulations introduce sound level limits in dB(C) for two of the three existing categories of events:

1. $L_{Aeq,15min}$ is less than 85 dB(A). In this case no specific requirements apply. This category includes restaurants, snack bars, cafés, sports halls, shops, children's events, supermarkets, etc.
2. > 85 dB(A) $L_{Aeq,15\ min}$ and < 95 dB(A) $L_{Aeq,15\ min}$/110 dB(C) $L_{Ceq,15min}$. If an event reaches these sound levels, the organizers are obliged to display information about the sound levels and the risk of temporary and permanent hearing impairment. In addition, if amplified sound is produced after midnight, the venue must record and keep a history of the following sound levels:
    - Instantaneous noise level in dB(A): $L_{Aeq\ 1s}$
    - Instantaneous noise level in dB(C): $L_{Ceq\ 1s}$
    - Average level in dB(A): $L_{Aeq\ 15\ minutes\ sliding}$

- Average level in dB(C): $L_{Ceq\ 15\ minutes\ sliding}$

This category includes the following venues: dance cafés, theatre cafés, youth centers, cultural centers, etc.

3. < 100 dB(A) $L_{Aeq,60min}$ and < 115 dB(C) $L_{Ceq,60min}$. In this category, the requirements of the preceding category apply, always when $L_{Aeq\ 60\ minutes\ sliding}$ and $L_{Ceq\ 60\ minutes\ sliding}$ need to be displayed and recorded instead of 15 minutes sliding. A reference person should be nominated and responsible for compliance with the regulations. This category includes the following venues: concerts halls, clubs, discotheques, night bars, etc.

Sound levels

As in the Flanders regulations, an exposure of 85 dB(A) for eight hours a day is not feasible for all recreational activities, it was adopted only as a maximum sound level for events that do not require specific authorization. An average time of 15 L_{Aeq} is determined for all categories except the last one where the average time is 60 minutes, because live performances which normally fall within the third category require sufficient dynamic through the activity, which can be ensured only through a longer assessment. The other reason for choosing 15 L_{Aeq} is to facilitate the enforcement measurement of the authorities.

dB(A) versus dB(C)

Unlike the regulations in Flanders, an average C-weighted sound pressure level was included in the Brussels regulations to capture the low frequencies. There are two main reasons for the inclusion of sound limits in dB(C):

- Negative impact of low frequencies on health of the attendees
- Negative impact of low frequencies on the people living in the neighborhood

Concerns around the inclusion of dB(C) levels in the regulation have been raised by experts in the field because of the lack of sound evidence on C-weighted sound pressure level and the feasibility of its application in entertainment venues.

Sound measurement

Unless otherwise stated in the environmental license, the sound measurement should be done at the mixer. If, for organizational or safety reasons, the microphone cannot be placed there, a correction must be applied to the displayed and recorded measurements. The

microphone is placed to ensure that a measurement representative of the noise level to which the public is exposed is obtained. In terms of positioning, the microphone must be positioned at a height above the floor between 1.20 m and 5 m, and if possible, at a minimum distance of 1 m from the side walls, the ceiling and any loudspeaker. In addition, the microphone is calibrated during its installation, and evidence of its calibration is made available to surveillance and police officers. The measurement is accessible to the agents in charge of the surveillance and to the police services at any time.

Announcements and Information to participants

For events with sound levels of $L_{Aeq,15min}$ less than 85 dB(A), event organizers are not obliged, but recommended to display pictograms (shown below) in the establishment and on tickets showing that the sound level is below 85 dB(A).

If an event reaches sound levels of > 85 dB(A) $L_{Aeq,15\ min}$ and < 95 dB(A) $L_{Aeq,15\ min}$/110 dB(C) $L_{Ceq,15min}$, the organizers are obliged to display pictograms required by legislation.

In addition, information about the sound levels reached in the venue should be displayed. Three types of sound levels should be displayed:

- Instantaneous noise level in dB(A): $L_{Aeq\ 1s}$
- Average level in dB(A): $L_{Aeq\ 15\ minutes\ sliding}$
- Average level in dB(C): $LC_{eq\ 15\ minutes\ sliding}$

In case of events where the sound levels reach < 100 dB(A) $L_{Aeq,60min}$ and < 115 dB(C) $L_{Ceq,60min,}$ the following pictograms should be displayed in the establishment.

In addition, the organizers must display the following noise levels reached in the establishment:

- Instantaneous noise level in dB(A): LAeq 1s
- Average level in dB(A): LAeq 60 minutes sliding
- Average level in dB(C): LCeq 60 minutes sliding

Hearing protection

In events with sound levels of < 100 dB(A) $L_{Aeq,60min}$ and < 115 dB(C) $L_{Ceq,60min,}$ CE certified hearing protection should be provided free of charge or at cost price.

Rest areas

A quiet zone with $L_{Aeq,15min}$ below 85 dB(A) should be available for the attendees in events where the sounds reach levels of < 100 dB(A) $L_{Aeq,60min}$ and < 115 dB(C) $L_{Ceq,60min}$. The rest area should take 10% of the publicly accessible area of the facility open to the public.

Implementation and control

In the Flemish region, considerable support and information to event organizers, as well as enforcers, was devoted after the regulations were accepted. In 2012, information sessions were organized in all provinces with more than 1,400 people having attended[10]. A technical manual and a brochure were available to organizers, with more detailed information being published on the website of the Ministry of Environment, Nature and Energy. An awareness raising campaign called “Iets minder is de max” (A little lower rocks) was initiated to make young people between 14-18 years old aware of the risks of hearing damage through loud

[10] Pee, G and Vindevogel, G. 2015. Noise standards for electronically amplified music in Flanders (Belgium). EAA-NAG-ABAV

sounds in entertainment venues. A radio campaign targeting young people and adults was launched, and an app was developed for users to measure the noise level at the location, with messages advising on further measures to be taken[11].

In Brussels, the Bruxelles Environnement website provides detailed information on the new regulations[12]. A guide for event organizers and facility managers has been developed, as well as awareness raising campaigns for the general public through radio ads, cinema, social networks, Spotify, etc. In addition, there is an ongoing training for the reference persons in entertainment venues who are responsible for the compliance with the regulations.

The organ responsible for the control and monitoring of the regulations is the Ministry of Environment, Nature and Energy. Each city has a department of environment with experts who are responsible for the onside measurement of sounds during events. The monitoring and control of the compliance is done by the local police. In cities which allocate substantial resources on health prevention and promotion strategies, the monitoring is very strict, and every event is being monitored. In the rest of the cities, mainly the big music events are being controlled. If a venue does not comply with the requirements for loud sounds, it will be given a penalty or event can even be stopped. Unfortunately, reports on implementation of the regulations in the Flemish part published after their issuing, show that the level of control in many cities is not optimal.

Impact

A report[13] evaluating the new regulations in Flanders was published in 2015, assessing the role of local authorities and the local police, as well as how the new regulations have been applied in the field. The report was based on: 1) a written survey sent to municipalities and police, 2) interviews with a number of representatives from municipalities and police, 3) interviews with experts to evaluate the implementation of the new regulations and their enforcement, 4) observations made during five different enforcement actions. Several conclusions were drawn in the report:

[11] Campaign against hearing loss, “helpzenietnaardetuut.be”, http://www. helpzenietnaardetuut.be
[12] https://environnement.brussels/thematiques/bruit-0
[13] https://www.lne.be/sites/default/files/atoms/files/EindrapportEvaluatieRegelgevingMuziekactiviteiten.pdf

- Enforcement officers are often confronted with problems during measurement. Most problems come from the measuring location and the measuring duration (too long), as well as the use of a double standard in measurement (one for 15 minutes and one for 60 minutes)
- Very few municipalities in reality measure according to the rules, therefore it is difficult to draw up an official report of compliance
- Even though C-weighted measurement is not a requirement in the Flemish regulations, some venues already add them systematically on their own initiative.
- Very often an objective measurement by the police is impossible as the organizers immediately decrease the noise levels upon the appearance of the authorities.
- Some police officers check for preconditions (whether the organizer measures the sound; has registered the event in the municipality; provides free earplugs; has the measurement equipment correctly adjusted) rather than doing an onside measurement during the event. Thus, measurements are usually a result of a complaint rather than spontaneous.
    - Often organizers comply with the regulations for control of sound exposure within the venue but do not comply with the existing environmental standards (e.g. regulations limiting the neighborhood noise).
    - In general, the number of findings of a violation of measurements shows a decreasing trend.
    - The report concludes that as a step forward, a mandatory calibrated measuring equipment in the venue, and mandatory constant monitoring in the middle of the venue where the public is present, are needed.

Strengths

- The sound regulations in both Flanders and Brussels are among the most comprehensive that exist, including multiple components such as sound limits, provision of hearing protection and information to the audience, as well as quiet zones for auditory rest (in Brussels).

- The decree in Brussels is one of the very few to include sound level limits in A and C-weighting.
- A report on the levels of implementation of the Flemish regulations has been published. Similar report is expected in 2021 for the Brussels regulations.

Weaknesses

- In the Flemish regulations, there is no clarity on the sound measurement procedure in terms of place where measurement needs to be done. In addition, enforcement authorities struggle to measure sound levels due to the double standard (15 and 60-minute intervals)
- Even though hearing protection should be provided in every venue, it is not clear how people use earplugs and whether they use it in a correct way
- The control on compliance with the regulations in some areas of Flanders is weak

France

History

In 1998, France issued its first decree (*98-1143*)[14] targeting specifically sound levels in recreational settings broadcasting amplified music. The decree was primarily regulating the sound in indoor venues with an upper permitted sound level of 105 dB average level and 120 dB peak level. Evidence suggested that this decree was not successfully implemented across the country, and its text was unclear to many event organizers. Moreover, there was no regulation regarding the low frequencies that are increasingly present in certain contemporary music. Therefore, in 2013, upon request of the Director General of Health in France, the High Council for Public Health published an expert report with new evidence-based recommendations[15] to protect audience hearing in places of broadcasted amplified sounds (discotheques, concert halls, festivals, bars…). Based on the High Council for Public Health recommendations, the Ministry of Health drafted a new decree and discussed it with the National Noise Council (CNB) which brings together all relevant stakeholders like managers of concert halls, festival organizers, health experts, public authorities, control organs, etc. Based on these discussions, in August 2017, the Prime Minister, the Minister of Health, together with the Ministers of Culture and Environment issued a new decree (*2017-1244*)[16] on the prevention of risks related to noise and amplified sounds. The new decree came officially into power on 1 October 2018. The new decree is much broader compared to the previous one, and covers not only indoor events, but also outdoor events where people are exposed to loud sounds, such as street parades or sports events.

[14] 1998 Regulation n° 98-1143:
https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000197582&categorieLien=id

Ministerial decision ("arrêté") associated to the decree :
https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000743266&dateTexte=

[15] Recommendations published by the High Council of Public Health in 2013:
https://www.hcsp.fr/explore.cgi/avisrapportsdomaine?clefr=378

[16] 2017 Regulation n° 2017-1244:
https://www.legifrance.gouv.fr/eli/decret/2017/8/7/SSAP1700132D/jo/texte

Current situation

In order to specify the conditions for implementing the decree, several documents were planned, among which a ministerial act ("arrêté"). The Ministries of Health and of Environment have started to develop the regulatory text, but the Ministry of Culture has raised concerns due to the protests of different stakeholders (e.g. music professionals or venue owners) on various elements of the decree. One such complaint concerns the difficulty to respect the threshold of 118 dB(C) "at any point of the place accessible to the public" as stated in the decree. Another criticism is about the difficulty to respect the emergence thresholds (intended to protect the neighborhood) in the case of the festivals, which according to the professionals, need to be increased. All this said, in the present context, the monitoring and control of sound in recreational venues is currently weak.

Summary of regulations

According to the decree, all indoor and outdoor public venues that accommodate activities involving amplified sounds exceeding "the rule of equal energy" 80 dB LAeq during 8 hours should comply with the regulations. There are six main components of the regulations:

1. The maximum sound level limit in the new decree is reduced from 105 to 102 dB LAeq,15min. In addition, a new C-weighting limit is set to 118 dB LCeq,15min. For activities specifically dedicated to children up to the age of 7, sound levels should not exceed 94 dB LAeq,15min and 104 dB LCeq,15min.
2. The regulations oblige event organizers to continuously record sound levels in both dB(A) and dB(C) and retain these recordings for six months in case the regulatory authorities request them.
3. In addition, event organizers should display information on the levels to which the audience is exposed. Rules 2 and 3 apply to all venues with a capacity of more than 300 people with the exception of discotheques which have to comply with the rules regardless of their capacity.
4. Organizers should inform the public about the hearing risks through messages displayed at the venues.
5. Event organizers should also provide free of charge hearing protections to the public.

6. Quiet areas for auditory rest where the sound levels should not exceed sound levels of 80dB(A) equivalent over 8 hours need to be provided or, failing that, quiet times for auditory rest need to be planned.

Sound limits

The High Council of Public Health of France (HCSP) had recommended 100 dB LAeq,15min as a main sound level limit for entertainment venues. This level was based on the scientific evidence and existing sound regulations in other countries. In addition, a new C-weighting peak limit was recommended at 120 dB by the HCSP because of the importance of considering low frequency sounds. But the decree limits (102 dB(A) and 118 dB(C)) are the result of discussions with relevant stakeholders based on the recommendations of the High Council of Public Health. However, there is no formal protocol on how to measure the dBC "in all points of the venue accessible to the public".

Sound measurement

The decree does not provide information on the point at which measurement should be done (mixing desk, loudest place for the audience, etc.). Anyway, public exposure can be measured in any place during the event. In addition, some entertainment venues still need to get new equipments to measure the C weighting dB.

Notifications

Event organizers must inform the audience about the health risks of loud sounds through notifications displayed at the venue. In addition, information on the levels to which the audience is exposed should also be displayed.

Hearing protection

Hearing protection should be provided free of charge at all venues in France. However, there is evidence that in some venues in bigger cities such as Paris the earplugs are still provided at a cost.

Quiet zones

A quiet zone must be available for the audience with an hourly sound level not exceeding 80dB(A) equivalent over 8 hours.

Implementation and control

- The responsible organs for implementation and monitoring of the regulations, as well as for application of enforcement procedures in case of non-compliance, are the Regional Agencies of Health and, in the case of Paris, the Prefecture of Police of Paris, and the health and hygiene communal services where there are some. The Regional Agencies of Health are attached to the Ministry of Health but have the autonomy to allocate human resources and budget according to their intervention priorities. Therefore, some Regional Agencies make more regular control checks on entertainment venues compared to others. However, the general trend shows that the control organs react primarily to complaints from the public rather than actively controlling the sound in venues, due to the limited resources.
- A private organization can support the Regional Offices of Health in the monitoring of the regulations but the sound control in entertainment venues can be done only in the presence of an agent from the Regional Agency of Health.
- Some Regional Agencies of Health send letters to venue owners or event organizers before an event happens, to inform them about the regulations they have to comply with.
- The decree indicates that a venue is fined when it does not comply with the sound limits established in the decree.
- The authorities (regional agencies of health) monitor compliance in particular through doing sound measurements in the venues.
- First fine is € 1500, second fine is €3000, and subsequent measures include confiscation of sound system and devices, or temporary closure of the venue.

Impact

After less than one year of application, there is not yet a study assessing the impact of the decree on levels of compliance or levels of hearing loss. However, the venues that are consistently complying with the regulations have not reported any outflow of audience or complains about the sound levels by the public.

Strengths

- The sound regulations in France are among the most comprehensive that exist, including various elements such as sound limits, provision of hearing protection and information to the audience, as well as quiet zones, or quiet times, for auditory rest.
- The decree is one of the very few to include sound level limits in A and C-weighting.

Weaknesses

- The opposition from certain professionals on various components of the regulation limits its entire implementation in all the places concerned.
- Some of the event organizers are not yet aware of the existing regulations.

Future directions

Currently, the Implementation Guide for all stakeholders and an instruction for control officers are under development and expected to be published later this year. More awareness raising will be done in order to inform industry, event organizers and the public on the new regulations. Regional Health Offices and NGOs, actively disseminate communication materials to inform the general public and the professionals about the sound regulations.

Switzerland

History

The drafting of the Sound Levels and Laser Ordinance regulating sound levels at recreational events in Switzerland was initiated by the Federal Office of Public Health. It was driven by the concerns of health experts in the country about the hearing of predominantly young people, as there were increasing reports of persons with permanent hearing issues after attending loud rock concerts. Techno music was also on the rise and some events were known to have very high sound levels in the 1990s. The Federal Office worked closely with event organizers to develop a well applicable ordinance that could serve both sides - people attending recreational events and event organizers. The proposal went through political process without much resistance and the first version of the Ordinance came into force on 1 April 1996. Afterwards, several revisions of the Ordinance have been made.

In 2007, new obligations have been laid down for the event organizers, including:

- Introduction of different categories of events with different requirements:
  - above an hourly sound level LAeq,1h of 93 dB(A)
  - above an hourly sound level LAeq,1h of 96 dB(A)
  - above an hourly sound level LAeq,1h of 96 dB(A) and lasting longer than 3 h

- Obligation to inform the audience about the health risk of high sound levels at all events with an hourly sound level above 93 dB(A)
- If an event lasts longer than 3 hours, a respite area must be available with an hourly sound level below 85 dB(A)

The 2011 revision included only minor changes, including clearer wording and new versions of standards referenced (for example for hearing protectors). The Ordinance is currently being integrated into the Ordinance to the Federal Act on Protection Against Hazards Arising from Non-Ionising Radiation and Sound[17]. The provisions of the previous Ordinance remain largely the same. The new version will include events without amplified sounds, such as carnivals. More information is provided below.

[17] https://www.admin.ch/opc/en/classified-compilation/20022391/index.html

Summary of regulations

- The Sound Levels and Laser Ordinance applies to all recreational venues in which the audience is exposed to electroacoustically generated or amplified sounds (e.g. clubs, concert halls, bars, restaurants, festivals, discotheques, fitness classes).
- It was Implemented in 1996 and the enforcement authorities responsible for its implementation and monitoring are the Swiss cantons.
- The rules postulated by the Ordinance apply to all venues and events regardless of their size or duration of the event (e.g. a concert of couple of hours or a bar that plays music the whole evening). However, events above a certain sound level that are lasting longer than 3 h must provide a respite area with an hourly sound level below 85 dB(A).
- According to the Ordinance, the maximum average hourly sound level is 100 dB(A) for all types of recreational events.
- There is also a limit for the momentary sound level. The maximum sound level L_{AFmax} (frequency weighting A, time weighting Fast F, time constant t_{ein} = 125 milliseconds) of 125 dB(A) must not be exceeded at any time during the event.
- Organizers of events with an hourly sound level above 93 dB(A) are obliged to notify the authorities before the event takes place.
- Organizers must ensure the provision of free earplugs, prominently display posters to provide information to the audience on the potential damage of their hearing.
- Organizers are obliged to measure the sound through a sound level meter.
    - Event duration less than 3 hours: the organizers are only obliged to measure the sound levels and make sure sound levels do not exceed the hourly level of 100 dB LAeq.
    - Event duration more than 3 hours: the organizers are obliged to measure the sound levels, making sure sound levels do not exceed the hourly level of 100 dB LAeq, as well as record the measurement and keep the recording for 30 days in case the authorities request it later.
- In case of events longer than 3 hours, respite areas must be provided for the audience where the level of sounds must be LAeq, 1h ≤ 85 dB(A).

- The Ordinance also stipulates requirements for events with children and young people under 16. In these events, the sound level limit is LAeq, 1h < 93 dB(A), but event organizers do not have to take any of the above-mentioned actions.

Sound limits

The rationale behind choosing a limit of 100 dB LAeq is based on a pragmatic rather than evidence-based decision of the Federal Office. The Federal Office used the existing legislation for sound limits in workers (85 dB(A) for 40 hours per week) and applied it to a short event that will last 3 hours, coming to an estimated 100 dB(A) hourly average limit for recreational events.

Sound measurement

- All venues should record sound levels (LAeq,5min measurements must be recorded at least every 5 minutes during the event) and make sure the sound does not exceed the hourly average of 100 dB(A).
- When the event is longer than 3 hours, organizers should also keep the recording for 30 days in case authorities request it.
- The measurement should be done at the loudest place for the audience (normally in front of the loudspeakers).
- If this is not possible (e.g. if there are many people at this place), a test measurement can be done in advance (for example with pink noise), determining the difference between the loudest point and the mixing desk, which is then added to the measured sound at the mixing desk during the concert.

Notifications

Event organizers must inform the audience about the health risks of loud sounds through posters. The Federal Office provides the posters to the organizers for free. Event organizers must make sure that the posters are put up at the event. On the other hand, the written notification to the enforcement authorities (Swiss cantons) must include information on the maximum hourly level, duration of the event, measurement procedures, and site plan (for longer events only).

Hearing protection

Hearing protection is provided at all events in Switzerland free of charge. There are no formal requirements for the type or quality of the earplugs provided. Normally, the earplugs can be accessed at the entrance of the venue or close to the bars.

Quiet zones / respite areas

A quiet zone or respite area must be available for the audience in events that last more than three hours. Notice to this need to be prominently displayed at the entrance of the venue. The respite areas should have an hourly sound level not exceeding 85dB LAeq, must take at least 10% of the total area provided for the audience, and be clearly marked and accessible to the audience. A smoking room may be included in the respite area provided that another part of the respite area is smoke-free.

Implementation and control

- The Federal Office of Public Health in Switzerland is the organ responsible for the creation and revisions of the Ordinance, as well as for provision of information and advice to the cantons, event organizers and the audience[18].
- The responsible regulatory authorities for applying the Ordinance are the Swiss cantons.
- Each canton has an indicated office that monitors the compliance of the Ordinance by checking sound measurements, provision of hearing protection and other requirements included in the regulation.
- The cantonal office is also the one applying enforcement procedures in case of non-compliance. Sometimes the cantonal offices can delegate the monitoring of an event to the local police. A venue can be fined if the sound exceeds 100 dB(A).

[18] Enforcement guidelines created by the Federal Office of the Swiss Government to help the Swiss cantons and event organizers implement the Ordinance can be found here:

In German: https://www.bag.admin.ch/dam/bag/de/dokumente/str/schall/slv-vollzugshilfe.pdf.download.pdf/slv-vollzugshilfe.pdf

In French: https://www.bag.admin.ch/dam/bag/fr/dokumente/str/schall/slv-vollzugshilfe-f.pdf.download.pdf/slv-vollzugshilfe-f.pdf

- The first act can be a warning, and then the second-time event organizers can be given a fine.
- A venue can also be fined if it does not provide free earplugs or the needed warning messages on the potential damage to people's hearing.

Impact

There are no systematic studies assessing the levels of compliance or the levels of hearing loss before and after the implementation of the Ordinance. There is, however, a survey that has been carried out to assess the percentage of people who use earplugs, and their perception of hearing protection.

For the study, 430 visitors from five concerts of different styles (pop, rock, heavy metal, classical) were interviewed. The survey took place directly at the concert halls. Results show that 39% of the interviewees wear hearing protection, which is a significantly higher proportion than in comparable foreign studies. Among those who do not wear hearing protection mentioned the following reasons:

- 50%: loss of music quality,
- 23%: ergonomically uncomfortable earplugs,
- 9%: social aspects such as difficulties maintaining conversation with friends, and
- 3% that it is not cool.

The results of the study show that the following factors have a strong influence on whether someone wears hearing protection or not:

- The social norm: Those who have friends who wear hearing protection protect themselves.
- A positive cost-benefit balance: Those who see clear advantages of the preventive action accept possible "disadvantages" (e.g. possible loss of sound quality) in favor of their health.
- An awareness of the real danger: Those who perceive the situation as risky for themselves wear hearing protection.

Strengths

- The sound regulations in Switzerland are among the most detailed and comprehensive that exist nowadays. The Ordinance includes different sound levels for different age groups, and a range of measures such as provision of earplugs, quiet zones and warnings.
- Because of the collaborative effort between the Federal Office and industry bodies, two decades after the implementation of the Ordinance event organizers in Switzerland are now fully aware of the regulations.
- The Ordinance is well accepted by all the stakeholders (regulatory authorities, music industry, event organizers)
- The Ordinance is constantly improved through series of revisions.
- The political structure of Switzerland allows each cantonal office to monitor closely the compliance of the Ordinance, unlike other countries where a national office might find difficulties to provide the required guidance and coverage at a country level.
- Cantonal offices collaborate well with the local police which ensures widespread monitoring.

Weaknesses

- There are no formal requirements on the nature of the sound level meter (e.g. 1st or 2nd class). Thus, event organizers are the ones responsible for the measurement of the sound and occasionally do it through iPhones or simple tools bought online. This poses problems, because often the measurements differ from the objective measurements of the Swiss cantons or the police, who must follow certain requirements (sound level meters need to be at least class 2 devices and verified by the Swiss Federal Institute of Metrology).
- Swiss authorities intended to include in the new revision of the Ordinance regulations on the quality of the sound level meter but met the opposition of the music industry. To obtain a mutually agreeable decision, the Federal Office decided not to include a revision of the sound measurement policy in the regulations, but the industry committed to create best practice recommendations for event organizers on the type of

measurement devices that should be used. These recommendations will be published soon.

- The implementation of the Ordinance is not equal in different parts of the country. Some cantons are well prepared to monitor the compliance of the regulations, but others lack resources and manpower to cover all music venues and events.
- There are no systematic studies carried out to assess the impact of the Ordinance. From the little evidence that is available, we know that the levels of use of hearing protection is higher than in other countries, but still does not reach even 50% of the audience. Many people are aware of the damaging impact of loud sounds on their hearing but still prefer not to use hearing protection.

Future directions

The Federal Office is currently working on a further revision of the ordinance. The Federal Council is expected to implement this new ordinance in mid-2019. The new ordinance will lead to several changes:

- The title of the Ordinance will be changed to “Ordinance of the Federal Act on protection against hazards arriving from non-ionizing radiation and sound”
- The new ordinance will be based on a new law that will ensure a more solid legal foundation.
- The Ordinance will include regulations for events without amplified sounds, the most prominent example of which are the carnivals where big groups of people often play live music and the sound can be very loud.
- In the case of non-amplified sound events, organizers will not be obliged to measure the sound, they will only have to provide hearing protection and information in the form of posters informing the audience of the potential damage that loud sounds can cause to their hearing.