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RESTAURANTS AND CINEMAS DOWNSTAIRS : A PLEASURE OR A FAILURE ?

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One of the urban environment challenges is to manage to locate such leisure places as cinemas, restaurants, or even discotheques, as close as possible to the living quarters. While this can be reasonably achieved in brand new buildings, with careful acoustical and urban planning and engineering, it often proves tricky, or even impossible, to achieve in the kind of older buildings that usually are to be found at the core of European cities.
Whenever any benefit results from the presence of such leisure places close to home, the neighbourhood can much more readily accept the acoustical implications. However, when no thought is given to the acoustical problems, the technical and relational efforts needed to correct the situation often prove to be beyond the capabilities of the operators.

INTRODUCTION

In the olden days, a classical arrangement of European buildings featured the shop at ground level, the workshop either in the courtyard or at the first floor, then the owner's apartments, and last the worker's quarters. This was quite readily accepted, as the noise from those activities was often perceived as a symbol of wealth and power. However, when the urban pressure applied in the mid fifties prompted a move of such activities to the suburbs, the rehabilitation of whole sections of buildings left vacant did herald a situation in which the dwellers were subjected to a noise that usually was no longer connected with their professional or daily chores.
And the noise from activities certainly did not falter : over the years, one had to reckon with the generalization of such pieces of equipment as cool chambers and heating and ventilating devices. Another trend was the expansion of mechanical deliveries, as well as the introduction of sound systems for various purposes.
With the introduction of more stringent noise control regulations from the mid seventies onwards, potentially delicate situations are now to be found. This paper intends to give an outline of such noise control problems, that are typically to be tackled in a European city.
In France, regulations pertaining to community noise [1] are based on the French standard AFNOR S31.010 [2], that considers the difference between the offending noise levels and the background noise level, that must not exceed 5 dB in daytime and 3 dB in nighttime.

SOME EXAMPLES OF FACILITIES TO BE FOUND IN BUILDINGS

Groceries

Groceries are part of the urban equipment to be found integrated in buildings. It actually used to be a strong sale argument to claim that such a store was located downstairs, and it indeed most often proves to be a commodity. However, the grocery trade steadily evolved over the years : to start with, while most of the merchandise was manhandled in the mid fifties, it now is delivered to the storerooms using trolleys, whose rolling noise can frequently be heard all over the building. Also, the increase in the size of coolrooms lead to bigger and noisier compressors, that did prove to be a noise problem. A determinant factor was the decision, in the mid seventies, to set the delivery hours at dawn, so as to limit the inconvenience to the traffic mobility (but introducing a most serious annoyance due to the noise of handling operations). More recently, the introduction of multimedia and leisure facilities in such shops did propel them into the loud leisure places category.

Bars and restaurants

Bars and restaurants can often be found at the ground floor of buildings, and must be reckoned with : while the noise from deliveries can start at dawn, the noise of dish cleaning can be heard till late in the night. There also is the noise from the air conditioning and from the kitchen exhaust, plus such sounds as table scrapping, background music, and people talking loudly. A further complication can emerge during summer time from the noise of people dining or drinking out.

Discotheques

Discotheques are, of course, a special breed due to the high noise levels they can generate. As, in their attempt to drain as much customers as possible, they tend to set camp in fashionable areas that are often to be found in the center of towns, serious problems are inevitable. In order to cope with the steady flow of complaints, the authorities have developed over the years some regulations [3,4] intending to make sure that hopeless situations (e.g., a discotheque in an old light building) will not be permitted. Such rules, that complement and do not substitute themselves to the main community noise regulations, rely on the achievement of a high sound insulation being achieved between the discotheque and any neighbour, that must be testified by a measurement report; the sound insulation objective (70 to 80 dB(A) pink noise in France) is defined according to the sound level value to be generated in the facility.

A FEW CASE STUDIES

A modernized cinema and pensioners

A ten story building was build in the late sixties with a cinema complex at ground level. The fact that this building managed to get permitted a couple of months before the new building acoustics regulation were introduced meant that it was considered a bit noisy right from the day of opening (the sound insulation was 48 dB(A) between flats instead of the 51 requested as of 1970). Apart from the flats, it housed a 6 halls cinema complex and a restaurant that rented its premises to the cinema company. Neighbours had steadily complained of the noise generated by doors slamming and people treading in the cinema or restaurant. But a major step was reached when the restaurant expanded and relocated its kitchen at first floor right beside a flat's kitchen, which resulted both in an increase of the number of meals and in a very close location to the flats. The position was not helped by the cinema company explaining to the neighbours that not only would it not attempt a move

against its charge, but they actually wanted the whole building inhabitants to pay for the noise reduction of cinema appliances ! However, in the mid nineties the cinema company managed to buy another cinema complex nearby, and decided to link them by means of a tunnel under the building's garden. For this operation to be conducted successfully, the company had to secure permission from the neighbours, and they were quick to request that the noise control problem be addressed first, for cinema and restaurant alike.

The subsequent acoustical study called for drastic measures in the restaurant, as impact noise (e.g. door slam, pan dropped on a shelf, etc...) transmitted to the nearby flats could reach 50 dB(A) (to be compared with a background noise level already under 30 dB(A) in daytime !), while the sound insulation was a bare 42 dB(A) : it called for a floating floor and furrings over the walls, as well as for a rebuilding of the lifts, whose mechanism and doors noise was identifiable two floors above ! In addition, it also called for a major redesign of the kitchen exhaust, that made its noise heard all over the building right to the tenth floor. Last, the delivery of beer barrels was performed by rolling them from the street to the storage rooms, which generated a deep rumble in most of the flats, which prompted the prescription of either a floating slab or at least the use of an efficiently suspended trolley. Most of this was rejected by the restaurant, which intended to carry on operating seven days a week whatever the situation was. The corrective measures were thus limited to the furring of walls and ceiling, as well as decoupling some machines using resilient pads, and attempting to use a resilient layer on the floor. In the end this did not prove sufficient to the neighbours (not to mention their having to cope with the noise from building activities during the night in between restaurant operation !) and further action still is contemplated.

As concerns the cinema, a test using a war film with the new sound system in an existing cinema hall proved highly spectacular, with all the flats being treated to the noise of a gunnery practice, proving if need be that the sound insulation had to be improved. This proved easier than the restaurant, as the internal spaces were laid bare for six months, leaving proper time and space to fit the various walls and floors. While masonry walls were used in this project, all of them were treated with a gypsumboard furring that was connected to a resiliently suspended gypsumboard ceiling. While this was easily admitted by the cinema operator, it proved a bit more difficult for him to be convinced of the need to have a similar ceiling in the hallways, especially with an absorptive ceiling also planned; a demonstration held on a small section of corridor under a room did prove the point, and that too was admitted. The floor was treated to either a resilient floor covering or carpet, which did manage to reduce the noise of people walking in the cinema to a value where it was drowned in the rumour from the building. The hard part actually was to find a way of reducing the noise from the exit doors slamming shut : as no noise efficient system proved acceptable to either the fire and safety inspectors or to the operator, it was eventually agreed by all the parties that a closure system would be used and would be kept in good order by the technical staff of the cinema.

The following points are worth noting :

. The reaction from the neighbours was swift and virulent as they were not concerned with the use of the facilities.

. The restaurant operators disregarded the complaints from the neighbours, and found themselves in trouble. Their refusal to close down operations for the implementation of corrective measures resulted in poorly efficient noise control solutions.

. The cinema operators initially disregarded the complaints too, but quickly found out that in order to carry on with their project it would be necessary to win the neighbours support. The noise control solutions were elaborated and implemented as part of the building yard work.

A new cinema with restaurant and neighbours

In the eighties the cinema business had suffered a bit, and the new concept was to build cheap constructions near business mails on the fringe of the town. While this was less expensive for the cinema industry, it also meant that the town inhabitants had to go to out of their area to view a film. The present project was launched by a company who believed in a close proximity concept calling for the cinema complex to be in town. This particular cinema was erected in an old shed dating back to the 1899 expo in Paris, and featured six cinema halls, a restaurant, and an exhibition area. It was located in an area that had no cinema and by a eight story building and a heavy traffic street. The acoustical objectives were set so as to comply with both the community noise regulations and the cinema standards (the latter calling for a NR 27 background noise level inside the halls). This prompted the halls to be made as a concrete shell inside the shed, while the restaurant and the exhibition area were treated to glazed walls. This complex has proved popular with the inhabitants, who say they do not have cause to complain about the noise, and who clearly appreciate the presence of a restaurant and a cinema at their doorstep, to the point that they are a sizable part of the customers.

A restaurant and an old neighbour

A 16th century building housed dwellings, and a restaurant at ground level. A neighbour on the first floor had steadily got annoyed over the years by the noise from the kitchen (both from the equipment and the activities), and decided it was no longer bearable when he retired. The restaurant owner managed through cunning to avoid any legal harassment for years till a change of official occurred, and he suddenly found himself confronted with a court of justice action, which reluctantly send him into action. The acoustical study performed on his request showed that the restaurant's air conditioner was a nuisance for the whole courtyard, as its compressor end was located there; furthermore, as the propriety had refused the erection of a metal duct in the courtyard for the kitchen exhaust, this was performed using a former chimney duct in the walls; the noise levels were quite impressive (up to 55 dB(A) in the neighbour's room) for apart form the aerodynamical problems the fan system was labouring hard, and its poor installment resulted in vibrations generated in the upper floor. Compared to that situation, the other sore points (mainly concerned with the lack of sound insulation in this old building) were not nothing to speak about. The restaurant owner found himself obliged to change his kitchen exhaust system and to improve the kitchen layout so as to avoid a direct contact between the kitchen furniture and the walls, while a sub ceiling was requested and a floating floor added in both the kitchen and the dining room. Such was the extent of the work that the restaurant had to be closed for a full six weeks.
The following points are worth noting :

. In these small old buildings, the visual aspect may often seem to be granted preference over the noise control aspects, this can stem from the fact that more neighbour or even authorities come to be concerned with the visual and architectural implications than people annoyed by noise.

. However, it is enough for one neighbour to complain to launch the legal machine into action.

. The routing of the kitchen exhaust often is a tricky problem that, between architectural requirements and noise control regulations, can spell the end of a restaurant at ground level of a building.

A beer bar and youngsters

Some areas can prove popular and attract various bars and restaurants in the same street. One such street downtown features buildings dating back to the 19th century. The sound insulation in such buildings is usually rather poor when compared to modern standards

(typically 45 versus 56 dB(A) pink noise), and the noise in the street due to people drinking and talking outside can be quite impressive. Yet, there are no complaints to be heard of, which can be accounted for by the fact that most of the neighbouring dwellings house rather young people who feel such noise is part of life and enjoy the low housing fees and the presence of bars so close to home.

A bar and neighbours

Another fashionable street features buildings dating back to the 16th century. There the sound insulation can be even worse : an acoustical consultant was once requested to perform a survey for a newly acquired bar, and found a 36 dB(A) pink noise actually being measured between the bar and the dwelling above it, while the ceiling height barely reached 2 m, thus preventing any hope of improving the situation ! However, part of the population in this street is made from pensioners that have spent their years in this street and who do not always take kindly to the noise annoyance from such activities. As the wooden structure of the buildings and the limited height does not allow for efficient noise control measures, any properly filled complaint usually results in the administrative closure of the incriminated bar ... till another one tries its luck in that spot, for this particular street is located close to touristic attractions.

A bar discotheque and neighbours

For half a century a theatre school had been operating in a mid 19th century building that was part of a block of contemporary buildings. On moving to a new facility the former school premises were taken over by a cinema, which operated till the cinema industry crisis put an end to it. However, long before closure the neighbours had noted that the sound system from the cinema could be perceived in the dwellings around. This was not entirely surprising, for the sound attenuation between hall and dwellings barely reached 60 dB(A) pink noise, and the background noise levels were already close to 23 dB(A) in mid afternoon. Then came a new concept of discotheque, complete with various regional bars and dancing. However the lavish decorum could not pass itself for sound insulation, and the ungodly hours worked by the discotheque soon catalyzed the neighbours into a court action. The acoustical investigation did show that most of the neighbours were separated from the main dancing area by a double masonry wall with a 2 cm air gap in between; however, due to the structural connections at the basement, low frequency noise was to be distinctly heard in the nearby dwellings. The initial investigation concluded that only a box in the box scheme could save the cohabitation between discotheque and neighbours. As the discotheque was anxious to avoid any heavy work, that would need a temporary closure, or a dismantling of the internal artwork, corrective measures were kept to a minimum and executed one at a time, with score of acoustical engineers visiting the nearby dwellings in a futile attempt to quantify the sound level reduction achieved and steadily irating the neighbourhood and authorities alike to the extent that the dancing area was ordered to close. The regional bars themselves managed to go on for a couple of months, but as the only corrective measure had been the implementation of a sound system limiter, that was regularly bypassed by the operators, final administrative closure was eventually ruled by the court.

A bar discotheque and neighbours in a modern building

In order to boost up the life of a new urban project, the integration of a café theatre was decided into one of the buildings. As this facility would feature some noisy music, it was prudently decided to build the main room as a heavy concrete box in the box. This was duly studied by an acoustical engineer, whose scope of work did not include site supervision and commissioning. On opening the facility, the newly arrived neighbours complained at once of high sound levels in their flats. It was soon found out that staff and customers alike

preferred to keep the doors between the bar and the theatre opened, and had even added a powerful sound system in the bar. However, upon sensibilizing everybody concerned and getting the doors closed and the sound system in the bar shut down, it turned out that there were significant structural transmissions between the theatre and the dwellings. This started a legal battle, with the neighbours suing the theatre operator who in turn sued the architect who himself tried to sue the contractor and the acoustical engineer. An acoustical diagnosis eventually lead to the discovery of huge chunks of rubble in the vertical spaces between the walls, and also of large amount of water in the void below. Once these were evacuated, the structural transmissions were sharply reduced, but still exceeded the objectives. A more careful acoustical diagnosis finally lead to a couple of the "resilient" pads supporting the box being made of concrete blocks ! It turned out that in the course of the building yard some careless subcontracted workers had run out of pads and chosen the easiest way to finish off the work. Needless to say, the correction of this situation, that could have been avoided with on site supervision, did take some time and efforts.

A large grocery with cafeteria and neighbours in a modern building

A ten story building built in the seventies featured a large grocery store at the ground level with a cafeteria. Dwellers had steadily complained - to no effect - about the noise levels generated by the reshuffling of merchandise and the delivery of products that occurred at night, and the sound system used in daytime. More to the point, as this grocery and cafeteria was the only one of its kind in the area, it did see extensive use in daytime, with nearby offices crowding the facilities with their staff for lunch and shopping. Ultimately, the implementation of a multimedia facility by the cafeteria, that lead to high noise levels and to miscellaneous characters hanging on during the whole afternoon, further complicated the matter. The noise situation did not falter over the years, and it was probably hoped by the manager that as most dwellers were only tenants, they would eventually get bored and leave. However, some strong witted characters eventually called a private consultant and got themselves a measurement report that came handily to support their lawsuit. The store manager countered that the sound insulation between the store or cafeteria and the dwellings did comply with the regulations; however it was clear that the noise levels did not satisfy the community noise requirements. Faced with such evidence (noise levels up to 38 dB(A) in flats as compared to a background noise level of 30 dB(A)), the court ordered corrective measures to be taken. Those included the laying of floating slabs in the storage areas so as to limit the noise from handling, the implementation of furrings in the cafeteria and kitchen, together with resilient floors, and a drastic reduction of the sound system. The plea for the store and cafeteria to perform the requested work by and by and during nighttime so as to avoid closure was accepted by the court under condition that the building yard noise would be tightly controlled, with a definition of a sound level limit in the dwellings and financial penalties in case of infringement.
It may be drawn from this case that even though a building is quite recent and does comply with building acoustics regulations, the community noise regulations can still not be fulfilled, and lead to very serious complications.

CONCLUSIONS

The implementation of leisure activities in buildings must be carried out with utter caution, as their noise may be a cause of annoyance. In modern buildings, it is possible, with careful acoustical and urban planning and engineering, to make provisions for a successful leisure facility integrated in its environment. However, the successful conclusion of the project also implies that an efficient on site supervision is carried out during the building yard. In already existing buildings, such an implementation can only be carried out after an acoustical diagnosis is performed and completed by a good definition of the project

requirements; more to the point, an information of the neighbourhood is necessary to defuse any potential complaint that could latter appear.

REFERENCES

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[3] Arrêté Royal du 24 février 1977 fixant les normes acoustiques pour la musique dans les établissements publics et privés (acoustic standards for music in private and public facilities)
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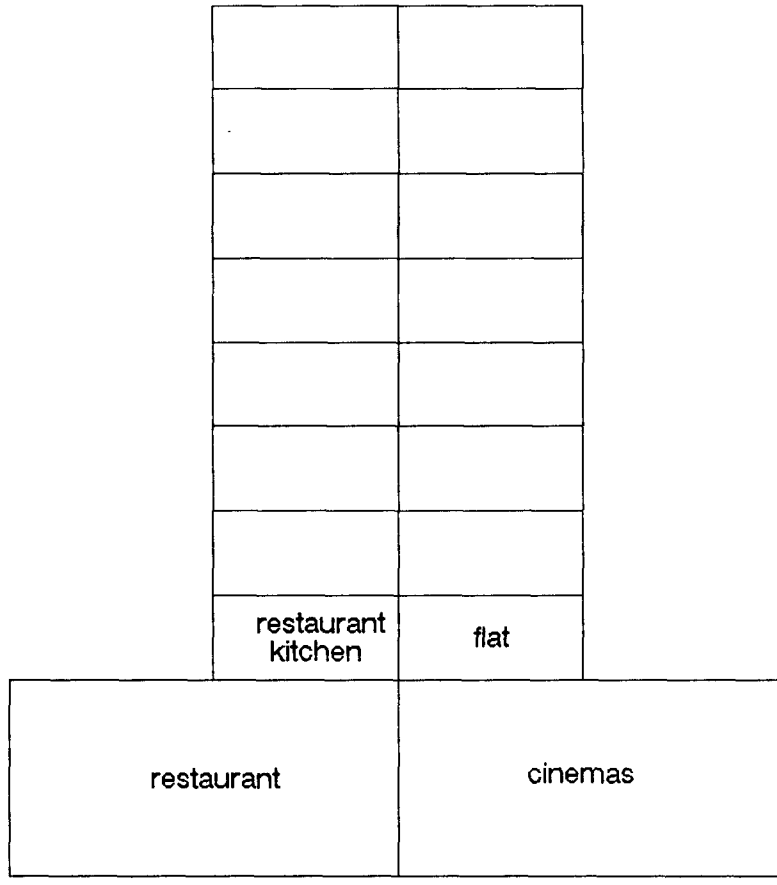

Figure 1 : Modernized cinema with restaurant in a building

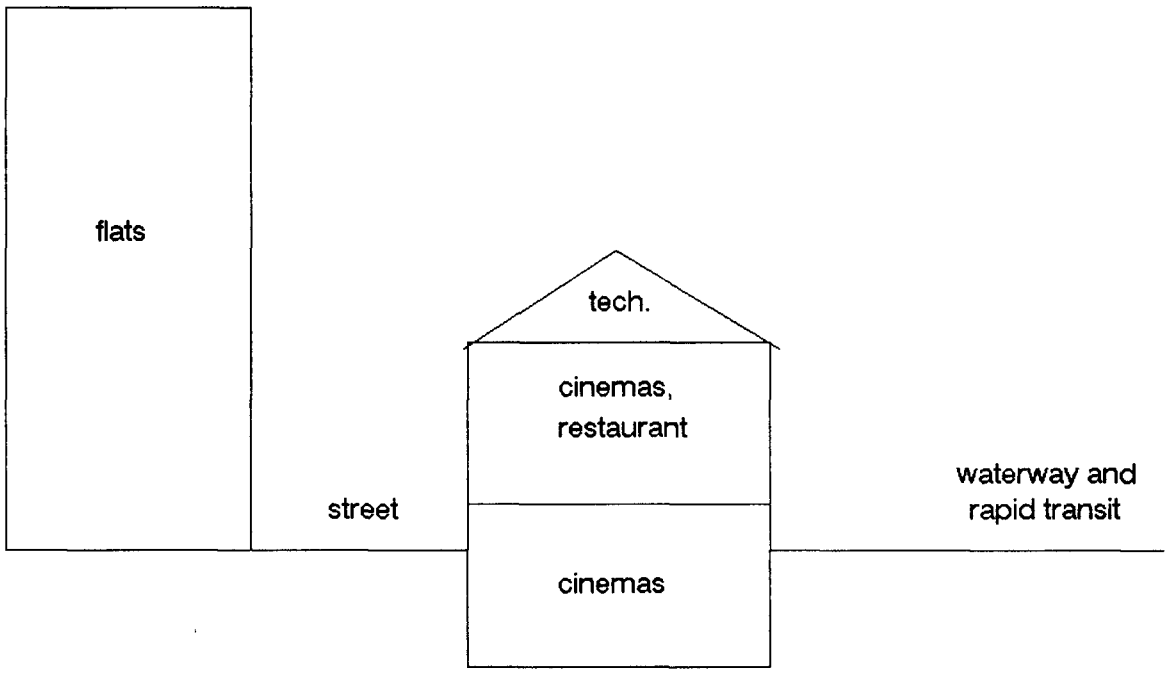

Figure 2 : A new cinema in an old shed close to buildings and transit ways

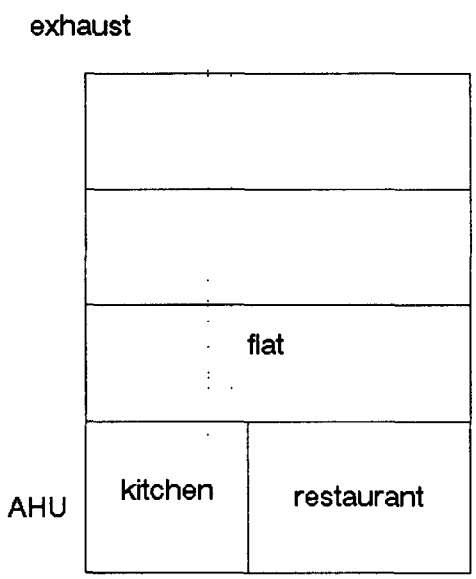

Figure 3 : Restaurant and kitchen under a flat in an old building

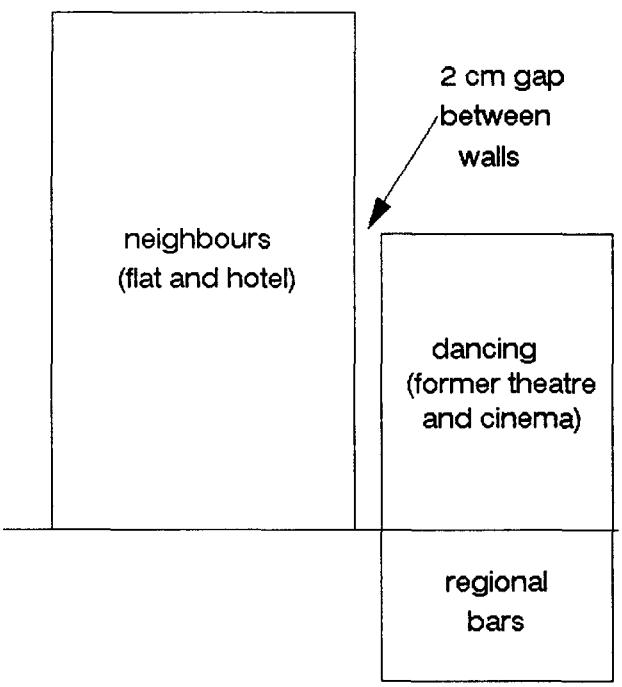

Figure 4 : Discotheque and bars in an old building close to neighbours