

ACOUSTIC STRATEGY: PUBLIC WORKS CANADA

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Background

Public Works Canada (PWC) is the federal government's custodian of real property, and is celebrating its 150th anniversary this year. PWC provides roads and bridges, canals, locks, and manages building accommodation for many federal operations, providing office space for Canada's 250,000 civil servants. PWC directly owns 400 buildings, and serves as property manager for several thousand more. The average age of PWC buildings is 40 years.

PWC is organized into six operational Regions, managed by a Headquarters unit providing overall direction and managing/conducting technology development activities.

Overview

This paper focuses on PWC office space, and presents an overview of the Acoustic Strategy which has been developed by PWC to act as a plan for ongoing activities to develop technologies in supporting the improvement of PWC buildings. Three strategic thrusts are presented, each supported by a series of tactics. The overall PWC goal is to provide an appropriate acoustical environment for tenants.

Acoustic Objectives

In a reasonable acoustical environment for the office worker there would be privacy and freedom from distraction in the office areas, and good speech intelligibility in meeting rooms. Acoustic security would be provided where required.

In open office areas this is achieved with a moderate level of background noise which masks transient noises, and yet provides a pleasant environment when combined with other factors which limit noise transmission between workstations. This appropriate level of background noise will maximize the potential for speech privacy between workstations, but not be so loud as to be distracting or cause occupants to raise their voices.

In closed offices the walls provide privacy and freedom from distraction. The background noise should therefore be lower, allowing for easier communication within the room. In meeting rooms the provision of low background sound levels and appropriate reverberation times allow for good communication.

Since too much noise, as well as too little, are each potential detractors to productivity, PWC has set target upper and lower limits on noise levels in the workplace.

PWC's first priority is to bring PWC buildings into line with established target levels. This requires that the status of the inventory be reviewed and appropriate actions determined based on technical deficiencies and costs. The strategy described in this paper concentrates on the development and provision of technologies which are required to achieve this priority. In addition, PWC will be working closely with the National Research Council (NRC) in the development and application of acoustical technology.

In order to put acoustic knowledge and technologies into practice, PWC needs to ensure that Regional staff are provided with the tools: procedures, resources, training; and thus expertise to control, measure and assess acoustics issues.

Strategic Thrusts

The three strategic thrusts are:

A. MEET CURRENT PWC COMMITMENTS

PWC has target levels of acoustic performance. PWC should know that it is meeting those targets.

B. DEVELOP FUTURE TARGETS

PWC needs to explore additional elements of the acoustic environment for which it may wish to establish targets.

C. IMPROVE KNOWLEDGE FLOW

Information needs to flow both into and out of HQ to the Regions, to ensure that the information produced is useful, and being used.

Tactics

The first strategic thrust requires the study of the acoustic performance of the inventory, from both the occupant perception perspective and the purely technical viewpoint. This includes enhancing the manner in which PWC receives and collates complaint data, and measures acoustics in buildings as a whole, and at individual workstations. PWC requires hard data on deficiencies: their nature and the technology required to achieve rectification and costs associated therewith. This information will be the basis for the direction of ongoing activities. PWC must ensure that tenants are informed, and that operations, maintenance, and all projects, are progressed in a manner sensitive to acoustics issues. The following tactics have been adopted:

- A1. Receive and analyze acoustic data;
- A2. Develop and implement repeatable test procedures;
- A3. Assess inventory performance;
- A4. Advise tenants about their impact on acoustics;
- A5. Ensure acoustics issues are reflected in the documents supporting all stages in the process of space delivery.

These tactics are supported by a set of activities which include monitoring the existing complaint tracking system, and recommending enhancements where appropriate. Comprehensive test kits are now provided for every two Regions, and a wide range of acoustics instrumentation is available for loan from HQ. An expansion of the Regional capability with greater distribution of more basic instrumentation, specifically type 2 sound level meters, is being considered.

PWC will be able to take a more pro-active approach to assessing workplace acoustics. The impact of tenant noise, and the vital role that the tenant plays in maintaining good acoustics must also be explored. Tenant departments must realize that PWC alone cannot guarantee good acoustics without their support.

While PWC has set targets for background noise levels, it would like to explore other target areas as it moves towards an improved acoustical environment. The setting of additional targets requires long lead times. It is anticipated that several years into the implementation of this strategy we will be in a position to recommend additional targets for consideration.

The second strategic thrust is supported by the following tactics:

- B1. Develop future acoustical targets, and assess their validity in terms of achieving occupant satisfaction, and cost effectiveness;
- B2. Initiate and continue technology development activities.

Since PWC only specifies targets for background noise levels, noises that are superimposed by the tenant are not accounted for. While PWC cannot control the actions of tenant departments, it can help these departments tailor their own environment by controlling noise sources and appropriately designing office facilities.

New technologies need to be developed which are sensitive to the diversity of the inventory, and the fiscal constraints currently facing the federal government. Three areas are currently being explored:

Slab to slab construction, while traditionally accepted as the only way to provide acoustic privacy between closed offices, is costly and inflexible. PWC in partnership with the NRC have developed the fuzzwall technique, which uses a stack of fibreglass insulation over the tops of partitions in the ceiling plenum, to act as an acoustic barrier. While limited in ultimate isolation ability, this technique provides a marked improvement over the open plenum. PWC is currently developing this technique for wide application, by addressing air handling and air quality implications as well as life cycle costs.

Door systems are often a problem when high acoustic security is required. While usually effective upon installation, PWC experience has been that many high acoustic security doors degrade over time. Longevity is an important issue to PWC.

Sound masking is also an emerging technology which is being explored by PWC, with wider application anticipated.

The third strategic thrust relates to the improvement of knowledge flow, both into and out of Headquarters. PWC needs to ensure that every opportunity to provide positive and useful guidance on acoustics issues to those directly responsible for the delivery of space is exploited. This includes existing and new initiatives. It is also essential that the ability of PWC HQ, to receive information both about the inventory and also the knowledge of other agencies, is enhanced and maintained. HQ cannot make informed decisions in a vacuum.

The following tactics have been adopted:

- C1. Maintain a close working relationship with NRC, and monitor industry and other agencies for developments;
- C2. Develop acoustics training programs for Regional staff;
- C3. Investigate and act on other mechanisms to transfer knowledge to the Regions.

PWC recognizes that most acoustics technology is developed by other agencies, and has formally recognized the need to keep abreast of these developments. Much acoustics technology exists, often however only at the research and scientific level and not necessarily in the format for common understanding or field application. Difficulties with acoustics in the Regions have been attributed to insufficient knowledge, especially of newly emerging technologies, by those directly responsible for the delivery of space. A common complaint from field personnel regarding acoustics is the frustration of not knowing about, and thus not being able to avoid errors in acoustics design, construction and operation. In particular, the following issues are considered critical: how to assign

and specify acoustic requirements; how to design for these; how to build, inspect and test for acoustics; and how to maintain acoustic performance over time.

Training programs for Regional staff are periodically revised and presented, and other mechanisms to transfer knowledge to the Regions are continuously being sought.

Summary

The discussion presented above provides an overview of PWC's acoustical technology development strategy. For senior decision makers this provides the overall direction and means to assess all activities which together will move PWC closer to the departmental objective of improved office acoustics. The overall objective is to maximize the return on expenditures to improve acoustic performance. In the current climate of fiscal restraint it is even more critical that all activities are complementary, and that an appropriate balance exists between competing demands for resources.