STRATEGIC BUSINESS PLAN
ISO/TC 43 "Acoustics"

EXECUTIVE SUMMARY

ISO/TC 43 was established in 1947 and has the following scope:

"Standardization in the field of acoustics, including methods of measuring acoustical phenomena, their generation, transmission and reception, and all aspects of their effects on humans and their environment. Excluded: electro-acoustics and the implementation of specifications of the characteristics of measuring instruments for acoustic purposes".

Scopes for the subcommittees are:

SC 1 "Noise"
Standardization in the field of noise in all aspects, including methods of measurement of noise produced by diverse sources in diverse environments and assessment of the effects of sound on humans and noise control."

SC 2 "Building acoustics"
"Standardization in the field of building acoustics, including architectural acoustics, acoustical properties of building materials and construction, and sound propagation in buildings."

SC 3 "Underwater acoustics"
"Standardization in the field of underwater acoustics (including natural, biological, and anthropogenic sound), including methods of measurement and assessment of the generation, propagation and reception of underwater sound and its reflection and scattering in the underwater environment including the seabed, sea surface and biological organisms, and also including all aspects of the effects of underwater sound on the underwater environment, humans and aquatic life."

Acoustics includes all aspects of generation, propagation, transmission, reproduction, reception, measurement and the effects of sound, and noise affects virtually every aspect of human endeavour in the air and underwater. The main objectives of the standards are to establish a good technical basis for noise reduction measures, for prevention, diagnosis and therapy for hearing damage due to noise as well as for determining the acoustic quality of environments and products. The standards also provide guidance to the acoustic adequacy for the basic design of machines, vehicles and buildings and are also important for the reduction of trade barriers.

It is a basic philosophy not to set limits for noise or sound insulation in standards but to provide the technical basis for information on the basis of which users can make a valid comparison of different products with regard to their acoustic properties and make their own choice. ISO/TC 43 is basically responsible for all ISO standards on noise and therefore maintains a close cooperation with a great number of other committees on noise from specific products.

The work of ISO/TC 43 and its subcommittees helps to pave the way to a higher quality of life resulting from lower noise exposure levels by reduction of the risk for hearing damage and annoyance due to noise for all humans in public, working and private environments.

This Strategic Business Plan provides answers to basic questions about the Technical Committee, its goals and accomplishments. Questions as well as comments on its contents or the activities of the TC and its subcommittees are welcome. Please contact the Committee Manager of ISO/TC 43 at agnes.sayer@din.de or the Chair, Mr. Douglas Manvell, at douglas.manvell@dmdbsoundadvice.com

Persons interested in participating in the work of ISO/TC 43 or any of its subcommittees should contact their country's ISO national member body for information.

1 INTRODUCTION

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure, which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard. An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable, which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 BUSINESS ENVIRONMENT OF THE ISO/TC

2.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

2.1.1 General

Acoustics is the science of

- generation;
- propagation;
- transmission;
- reception;
- prediction;
- protection;
- reproduction;
- measurement; and
- the effects of sound.

It is intertwined with our lives in many ways. There is a positive aspect of sound, for example, in human communication, culture, technology, medicine and navigation, but also a rather negative one since, in connection with traffic, manufacturing, community activities and sports, sound can turn into noise. Noise annoys and irritates humans and may lead to negative psychological effects. Exposure to intense noise or noise over long periods can lead to hearing damage and other physiological impairments.

Standardization in the field of acoustics covers both the negative and positive aspects of sound. Its major objectives are to establish methods for

- noise measurement, prediction and assessment in the air and underwater;
- determination of acoustical quality of environments, products, buildings and rooms; and
- measurement and description of human hearing functions.

The international standards produced by ISO/TC 43 involve the quality of life for all human beings. The work is deeply tied to the economies of all nations in the form of trade, jobs, manufacturing, national competitiveness and GDP. Its economic impact is impossible to measure, but it involves governments, manufacturing sectors, consumers, labour forces and the public at large. All have a major stake in the standards produced in this technical area ranging from vocabulary and nomenclature to the basics of measurement, analysis evaluation and prognostication.

Although international standards do not carry the weight of law, they profoundly influence the language, interpretation and direct extent of the law. Technical standards are often written into contracts to monitor acceptance and performance.

2.1.2 Specific areas

a. Noise control

The noise control market is generated by the following aspects:

- Consumer demands, i.e. noise control in cars, noise control of domestic equipment, etc. This part is market driven.
- The protection of workers (occupational noise). This part is driven by law.
- The protection of people in their domestic environment against noise from outdoor sources (environmental noise) and noise from neighbours and building services (building codes). These parts are also driven by law.

The noise market related to occupational and environmental noise has two complementary sides: The financial damage due to noise and business opportunities (sale of products and services). The financial damage side determines the potential market for noise control because, at a macro scale, the costs of noise control shall not exceed the costs of damage due to noise.

b. Building acoustics

In building acoustics, standardization covers the field of acoustic properties of building elements, of rooms, and of buildings, including laboratory and field measurement methods, its expressions of results and accuracy, rating of acoustic properties of elements, rooms, and buildings and also methods for determining the acoustics of buildings and single rooms from the performance of its elements. International standardization will have a great influence on national regulation and on planning and economy of new buildings.

c. Speech and hearing

The human hearing function is strongly related to both noise control and to building acoustics.

The normal hearing function has to be defined to demonstrate deviations from the normal baseline. Noise induced hearing loss is one important cause of deviation from normal hearing. Age is another, and consequently, age effects have to be defined to distinguish between these two major factors. The measurement of hearing is today an important tool for diagnostic work, not only for the study of noise damage, but in general where the hearing function deviates from normal. International standardization has an important influence all over the world, and when hearing function is analysed in the same way, large scale investigations will make it possible to compare results and to study the different effects on the hearing function.

d. Underwater acoustics

There is increasing concern about noise in the world's oceans and other waterways. Commercial ships, cruise ships, military ships and submarines, air guns used for oceanographic research and minerals exploration, water sports, active sonar, acoustic communications, offshore alternative energy sources (e.g., wind farms, wave turbines), and marine construction projects (e.g., oil rigs, bridges, alternative energy development), along with natural sources (e.g., rain, lightning strikes, earthquakes) and biological sources (e.g., fish choruses, snapping shrimp, marine mammal vocalizations and echolocation) combine to make the seas noisy places. Governments, industry, environmental organizations as well as concerned scientists and engineers are struggling to understand the impacts that this noise may have on marine ecology, marine animals, oceanographic research, underwater biological and anthropogenic acoustic communications, and underwater surveillance of major waterways and ports for protection from potentially catastrophic natural and/or terrorist events. These efforts have revealed that there is a need to standardize the methods of measurement and assessment of underwater noise from various sources, underwater sound propagation and reception of underwater sound by transducers and biological organisms. These standards aim to support legislation and regulations such as the EU's marine strategy framework directive 2008/56/EC and the International Maritime Organisation's *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life*.

2.1.3 Stakeholders

a. Industry

Manufacturers and users of noisy machines, noise reducing devices, acoustical and building materials, have a vital interest in the specification of harmonized and practice-oriented test methods and in other related guidance to meet regulatory requirements and consumer expectations when designing new products and to achieve transparency in noise declarations and establishment of noise control performance. Also, manufacturers of sound measuring instruments and software have an interest in the application of their products. The framework of ISO/TC 43 is ideal for manufacturers to communicate information on possibilities created by the latest technical developments in instrumentation and measurement techniques and to obtain information on likely developments in measurement requirements.

b. Community

No global values are available but it is estimated that in the EU 10 million people are exposed to damaging levels of noise at work, most of whom are at risk because of the use and operation of noisy machinery. 20% of the European population suffers from noise levels that scientists and health experts consider to be unacceptable with respect to annoyance, sleep disturbance and adverse health effects.

It is of general interest to the community to reduce noise and protect against noise in all its aspects, outdoors (including noise inside vehicles), indoors (at the work place) and where people are in public and in private places in order to improve the quality of life. Acoustic standardization can provide guidance on all aspects of the measurement and reduction of noise and information on noise generated by products and, therefore, serves this global interest.

c. Public authorities

Public authorities deal with the development and application of legislation in the areas of occupational and environmental noise. In addition, there is growing interest in the effects of anthropogenic underwater noise. A convenient way to separate technical discussions of measurement methods and political discussion of the setting of limits is to use standardized measurement and rating methods for the setting of limits. Standards can provide requirements and guidance on measurement, on assessment of risk, on acoustic performance and on low-noise design and planning.

d. Test laboratories and consulting engineers

There are an increasing number of requests for standardized methods of measurement of noise, including measurement uncertainties, for use by accredited test laboratories as well as by private consulting acoustical engineers, companies making their own noise measurements, etc. In addition, guidance documents are sometimes needed to assist the parties concerned in selecting the most appropriate measurement standard and/or suitable noise reduction measures.

e. Research institutes

Over the years, international standardization has become an ideal framework for experts to work together on the development of measurement methods and other types of research, notably related to noise problems. In many cases it has been found that international standards provide the most convenient way of collating and communicating results from research studies to the international community.

f. Health and safety experts and inspectors

In many industrialized countries, noise-induced hearing loss is at present the most widely recognized occupational disease. Noise reduction at the work place, selecting low-noise machines, hearing protection and hearing conservation programmes are of major concern improving working conditions and reducing the compensations to be paid.

g. Physiologists and audiologists

Their work includes, for example, definition of normal hearing, measurement of main hearing functions, hearing rehabilitation, effects of noise on humans, calibration and proper use of audiometers, and hearing conservation programmes.

h. Communication engineers

Their work includes, for example, telecommunications, radio and television, and sound studios, as well as acoustical warning signals and related equipment.

i. Trade and consumer groups

Standardized test methods and specifications provide a convenient way of regulating the communication between buyers and sellers.

2.1.4 Regulatory and legal issues

A number of EU directives, notably concerning the safety of machinery, noise emission in the environment by equipment used outdoors, personal protective equipment and construction products have significantly affected the work and the priorities of ISO/TC 43 and its sub-committees. Most projects are developed as joint ISO and CEN standards by parallel procedures according to the Vienna Agreement with the related CEN committees on acoustics and building acoustics. A number of the standards prepared by ISO/TC 43 in support of these directives help to remove technical barriers to trade and to improve social conditions.

ISO/TC 43 continues to cooperate with UN-ECE to support development of ECE vehicle noise emission regulations based on ISO standards. Three main ISO standards presently in use or proposed to be used by UN-ECE are ISO 362 (all parts), ISO 5130, ISO 10844, and ISO 9645.

A major factor, which will have an impact on the development of the markets, is the growth in demand for noise control with increasing wealth and with increasing population density.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC:

It has not been possible to get global figures for the value of the complete work of ISO/TC 43, notably since this committee does not prepare product standards, but fragmental figures for various parts of the work are:

- The social and economical cost of occupational deafness is very high, 100 kUS$ as an order of magnitude for one single person. The yearly direct cost of occupational deafness is 60 MUS$ in France and believed to be around 200 MUS$ in Germany. Noise at work is also a cause of accidents due to the disturbed perception of speech and danger signals.
- The value of trade in machinery within Europe is several hundred billion US$. Since safety aspects are now better dealt with, “less noise” has become a sales argument for the machinery put on the market for sale in the EU and for export as well. One reason is that the use of quieter machines improves the working conditions and therefore increases productivity.
- The yearly worldwide damage due to noise can be estimated to be between 100 and 1000 billion US$. It consists of medical costs, costs of lost labour days, reduced housing prices, reduced land prices, reduced productivity, reduced safety and other factors. The available data is weak, but the order of magnitude is clear.
- The present worldwide business in noise control is probably a factor 10 smaller than the present damage, which means that there is room for growth.
- The products for noise control consists of two major parts:
  - Explicit products like measurement equipment, software, consulting services, noise control devices.
  - An implicit part, which only partly overlaps with the first part:
    1) many buildings and nearly every modern machine contains noise control elements; the related costs are often low, but the enormous number of systems will nevertheless generate very large figures;
    2) in developed countries the costs of traffic infrastructure contain significant parts related to noise control (in Europe between 100 and 1000 million US$/year is spent on noise barriers, special road surfaces, insulation of buildings and other measures related to the reduction of road traffic noise). Altogether the present world wide business related to noise control probably lies between 10 and 100 billion US$.
- The European market for sound isolating glass is 70 million US$.

3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

A great number of the standards prepared by ISO/TC 43 are basic standards directed to sector specific CEN and ISO product TCs enabling them to draft noise test codes and sound insulation performance standards on the basis of the "B-Standards".

The work of ISO/TC 43 will contribute strongly to an improvement of health. It is also important for the reduction of trade barriers and for a cost-effective approach in the field (at a macro level the use of many different methods is not cost-effective).

Technical standards produced under the auspices of ISO/TC 43 and its subcommittees directly impact public and private environments. These standards also provide guidance as to the acoustic adequacy of the basic design of machines, vehicles and buildings. The results of the ISO/TC 43 standards will help pave the way to a higher quality of life resulting from lower noise exposure levels by reduction of the risk for hearing damage and annoyance due to noise for all humans in public, working and private environments.

4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

4.1 *Countries/ISO member bodies that are P and O members of the ISO committee*

4.2 Analysis of the participation

The major groups represented in ISO/TC 43 are described under 2.1.3 above. At present the most important groups represented in ISO/TC 43 are test laboratories, research institutes, universities, health and safety organizations, consultants and some specific industries (automotive, measurement equipment).

Representatives of governments, consumer organisations and relatively under-represented industries are encouraged to participate in order to provide a better balance of opinions and strengthen the quality, value and appeal of the TC’s standards. The managements of the Technical Committees and its Subcommittees are encouraged to take appropriate action to facilitate this.

Likewise, parties that require and use standards to ensure high-quality assessments and assist in business decision making are encouraged to participate. The managements of the Technical Committee and Subcommittees are encouraged to take appropriate action to facilitate this.

Experts who participate in the working groups represent a wide range of countries and the majority of geographical regions.

5 OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

5.1 Defined objectives of the ISO/TC

Based on the considerations above, the ISO/TC proposes the following objectives and strategic directions for its future work:

The main objective of the TC is to improve its market-oriented approach and to produce standards that fully satisfy the needs of the market (the users).

A basic philosophy is not to set limits for noise, or performance parameters of spaces, building elements and structures in standards but to specify methods of measurement and evaluation so that, for example, all noise measurements carried out in accordance with International Standards yield noise data, which are comparable for noise exposure, immission and emission. ISO Council has accepted the role of ISO/TC 43 in taking ISO Council Resolution 43/1972:

> Council confirms that ISO/TC 43 is solely responsible for formulating methods of measurement and systems of assessment of noise emitted by different sources and also their effect on humans. Other ISO technical committees dealing with problems related to acoustics measurement will establish direct contact with ISO/TC 43 in order to decide mutually the appropriate method for the establishment of the International Standard concerned. The IEC should be requested to continue the close relationship, which already exists on this subject.

This does not mean that all noise or sound insulation measurement methods are necessarily to be prepared within ISO/TC 43. Basic acoustical measurement standards ("type B standards") are prepared within ISO/TC 43, but cooperation (the form of which is decided upon from case to case) must be established with other pertinent ISO or IEC technical committees in the preparation of international standards on noise from particular products and noise test codes ("type C standards") in order to fulfil the intent of the Council resolution. Thus, in addition to the major parties listed in 2, manufacturers of particular types of machinery or building products may also participate in ISO/TC 43 on particular items or these may be prepared jointly under the auspices of relevant ISO product committees in close cooperation with ISO/TC 43.

Much of this work concerning machinery noise is based on ISO/IEC Guide 51 and (EN) ISO 12100 and thus complies with EU directives, too.

The most effective and economical method for noise control is the noise reduction at the source by means of special measures in the process of designing and constructing equipment. For this purpose, generally accepted methods for the evaluation and prediction of noise emission values of the equipment, under actual operating conditions and in the intended working environment, and the noise control performance, are needed to assist manufacturers and consulting engineers.

Specification of instrumentation requirements is essential for the specification of a measurement method. In the standards of ISO/TC 43, this is done by strict reference to specifications prepared by IEC/TC 29 "Electroacoustics". ISO/TC 43 maintains a very close liaison with IEC/TC 29, and in some areas participants in working groups are the same.

To avoid ambiguities, standards prepared by ISO/TC 43 and its three SCs traditionally contain mandatory requirements with respect to test methods, test conditions, measurement equipment, etc. In some areas, however, guidance documents are needed, for example, to select an appropriate measurement standard from a family of related standards, to provide general information on a variety of noise reduction measures for the benefit of non-expert users, etc. Even if these documents are less stringent, it is the policy of

ISO/TC 43 to issue them as International Standards rather than as Technical Reports or Technical specifications.

Due to the great diversity of major stakeholders (see 2.1.3) and their specific requests, as expressed by New Work Item Proposals from member bodies, ISO/TC 43 feels unable to give priority to a specific field but elaborates a great number of standards for different groups in parallel. There are no strict borderlines between the following groups:

Expanding work areas

- application of basic machinery noise standards in the preparation of noise test codes in cooperation with other TC
- machinery noise emission, validation of measurement methods
- environmental noise measurement and evaluation
- measurement and evaluation of occupational noise
- building acoustic measurements of specific room and building acoustical properties
- short test method for the evaluation of sound insulation
- calculation methods for the estimation of acoustic performance of buildings
- noise prediction methods
- improvement in dealing with uncertainty in noise measurement standards
- measurement and assessment of underwater sound
- measurement and evaluation of noise in relation to open offices
- hearing aid fitting management
- Infrasound

Completed areas of work

- basic standards on the measurement, description and declaration of machinery noise
- basic standards for the measurement of hearing protector attenuation
- basic standards for audiometry
- acoustic quantities, units and reference quantities
- basic standards for the measurement and rating of sound insulation between rooms and of building products
- basic standards for the measurement of acoustic properties of building products

Areas under steady progress

- transport noise, indoors and outdoors
- noise reduction, noise control performance
- sound propagation, indoors and outdoors
- basic standards for the measurement of room acoustic properties
- methods of evaluating sound fields in rooms and structures
- sound scattering properties of surfaces
- UAV noise emission
- Wind Turbine Noise

Areas where research is needed

- a common tone detection method for use in all ISO/TC 43 and SC 1 standards requiring tone assessment
- methods and instrumentation requirements for urban noise-monitoring, short-term and long-term
- methods to determine specific sound more accurately in environmental noise such as identifying and localizing sound sources using e.g. directionality or sound content, correcting or discarding data due to residual sound sourch as sound from weather conditions
- structureborne noise emission
- measurement and evaluation of emission of sound sources
- measurement and evaluation of soundscapes
- measurement and evaluation of human hearing characteristics
- measurement and evaluation of impulsive noise, immission and emission

- advanced methods of measurement of hearing protector attenuation and effects on auditory communications
- measurement uncertainty including uncertainty calculations that support the use of new technology
- measurement of noise from rail bound vehicles
- sound quality of communication systems
- description of acoustic comfort in transport vehicles (road, rail, air, water)
- noise emission from urban air mobility (UAM) such as Unmanned aircraft vehicle (UAV), Unmanned Aerial Systems (UAS) and electric vertical take-off and landing aircraft (eVTOL), as well as Electric Conventional Take-Off and Landing aircraft (eCTOL)
- low frequency sound absorption and insulation
- active noise controldescription of acoustic comfort in buildings (homes, offices)

Potential future possibilities

- Application of (relatively) new technology withing environmental noise assessment
- speech and voice communication with computers
- automatic speech recognition
- psychoacoustics in relation to product sound quality
- new types of test methods, new measuring techniques made possible by modern technology
- acoustical assessment of products based on new technology such as self-driving cars (in close cooperation with other relevant ISO/TCs and SCs)
- universal design in acoustic concerning speech, sound and communication conditions in public buildings and in the environment
- Buidling information modelling
- Acoustical evaluation of green energy sources

5.2 Identified strategies to achieve the ISO/TC's defined objectives

Formally, the result of voting of the member bodies on new work item proposals and not the TC itself decides on the acceptance of new work items. Therefore, the only strategic element left is the discussion of new work item proposals at plenary meetings, which can guide the member bodies but this is not decisive.

Due to the need for European Standards as a basis for the implementation of the machinery directive 2006/42/EC and the construction products regulation EUReg 305/2011 of the EU, priority has, over recent years, been given to the preparation of machinery noise standards and standards for the measurement and rating of sound insulation in buildings and of building products. In order to avoid duplication of work and the creation of technical barriers to trade, close liaisons with the European Technical Committees CEN/TC 211 for acoustics and noise, and CEN/TC 126 for building acoustics, have been established. As a result, only very few special technical European Standards are prepared, but the ISO standards are implemented directly or by parallel voting procedures. This way of operating will help to open the market and permit member bodies from outside Europe to participate. Contact has also been established with CEN/TC 159, which is preparing standards, notably on speech communication, acoustical signals, sound quality of communication systems, communication with computers, in support of the personal protection equipment regulation (ref. EUReg 2016/425).

Additional information on European legislation supported by the standards of the above mentioned European Technical Committees can be found in the business plans of the respective CEN/TCs, which can be downloaded here.
The present number of work items is the maximum that the available resources can handle. In order to maintain the activities at this level, the following priorities are suggested:

Priority areas for noise:

- environmental noise
- transport noise
- noise at work
- noise prediction
- application of basic standards for noise emission in the preparation of C-standards (e.g. by providing technical assistance to other ISO and/or IEC TCs)

Priority areas for building acoustics:

- additions concerning modern measurement methods to existing standards
- simplified measurement methods
- special building acoustic situations

Priority area for underwater sound:

- quantities and procedures for description and measurement of underwater sound from ships
- terminology
- measurement of underwater sound from percussive pile driving
- standard target method of calibrating active sonars

In the programme of work of ISO/TC 43, in terms of registered numbers of active work items, almost 10% of the items are dealt with by the main ISO/TC 43, 65 % by ISO/TC 43/SC 1, 20 % by ISO/TC 43/SC 2, and 5 % by ISO/TC 43/SC 3.

Close cooperation between ISO/TC 43 and IEC/TC 29 "Electroacoustics" is maintained particularly in the field of audiology. Several liaisons to other ISO/IEC committees and other organisations have been established to encourage the use of ISO/TC 43 documents for relevant applications and to align the development of ISO standards with regulatory requirements. Cooperation between the subcommittes of ISO/TC 43 has been intensified to identify areas of common interest and to share experience.

In many fields of the work of ISO/TC 43, the cooperation and contacts established by the process of preparing the standards is just as important as the publication of the final International Standards. Over the past years ISO/TC 43 has found itself bridging all aspects of the many interested parties in the standardization work, ranging from science to politics. It is expected that the increasing use of modern technology will both open and speed up the standards work, with the result of an efficient and cost-effective process for the preparation of International Standards in the area of acoustics.

5.3 Operating Plan

In order to ensure a permanently high quality of Standards and Technical Specifications developed by ISO/TC 43 and ISO/TC 43/SC 1 while not extending the workload of the Secretariat beyond an acceptable limit, the following Operating Plan shall be observed:

1. The terminology of each revised or newly developed Standard/Technical Specification shall be fully in accordance with ISO/TR 25417. Ongoing projects shall meet this requirement at least from the DIS stage on. If a WG has a problem with the application of ISO/TR 25417, it may address this problem to the Advisory Panel (see 7.1.1) asking for its position.

2. Each revised or newly developed Standard/Technical Specification concerning acoustic measurements or sound predictions shall include valid statements on uncertainty in accordance with Guide 2, doc. 43 N 1361. From 2010 on, each newly published relevant Standard/Technical Specification shall contain an uncertainty evaluation fully complying with the guide to the expression of uncertainty in measurement (GUM).

3. For the preparation of new or revised acoustic measurement standards or similar documents, the recommendations of Guide 1 for drafting instrumentation requirements in documents prepared by ISO/TC 43/SC 1, doc. 43/1 N 2292 shall be taken into account.

4. An initiative to increase participation from larger countries who are currently less well represented in the Technical Committee, such as China, India, Brazil, South Africa

5. Application of new technology such as Artifical Intelligence, Internet of Things, Building Information Management, etc within our standards

This Operating Plan is up to regular review at each plenary meeting and may then be amended, if necessary.

6 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

The key objectives mentioned above can be met with a reasonable probability of success only if the intellectual assets currently available to the TC and SCs are fully and efficiently utilized. The key to future progress is the ability of the member bodies to staff the key working groups with knowledgeable experts from a wide range of their national constituencies so that diverse views will insure a well-formulated technical standard fully accounting for the views of all prospective standards users.

For many items, validation of a test method is dependent upon funding being available to undertake the necessary prenormative research, see notably those referred to in the "objectives of the ISO/TC" section.

Problems have been identified related to the lack of acoustical expertise in many product TCs concerning noise and building acoustics which makes cooperation difficult, notably due to the limited number of experts of ISO/TC 43 and its sub-committees with the resources to do such work.

It must be noted that i.a. because of the many non-commercial aspects of the work of ISO/TC 43, many experts participate on a voluntary and at times even self-paid basis. This obviously sets a limit to the available resources and creates problems and resignation in meeting the increasingly stricter progress requirements of the ISO/TMB.

Finally, it must be noted that the maintenance of the existing standards requires a considerable amount of work (updating, technical amendments [e.g. to cover the uncertainty issue which is becoming increasingly important] and complete revisions) to keep the standards technically sound and up to date and this already takes up an important amount of the available resources.

7 STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

This section gives an overview of the ISO/TC's structure, scopes of the ISO/TCs and any existing subcommittees and information on existing and planned standardization projects, publication of the ISO/TC and its subcommittees.

7.1 Structure of the ISO committee

7.1.1 Advisory Panel of ISO/TC 43

ISO/TC 43 and its subcommittees have established a common Advisory Panel in order to advise the Committee Managers and the Chairpersons in all questions regarding the strategy of ISO/TC 43 and its subcommittees and its implementation. In particular, the Advisory Panel has the following tasks:

1. to review the Business Plan of ISO/TC 43 on a regular basis and to propose amendments, if necessary,

2. to assist the Secretariats in finding financial resources in order to ensure a proper functioning, if necessary,

3. to assist the Secretariat in limiting the actual workload to an extent which is reasonable in relation to the available personal resources, if necessary,

4. to assist the Secretariat in dealing with the work of other ISO Technical Committees whenever acoustic subjects are concerned which affect the overall responsibility of ISO/TC 43 as laid down in the Council Resolution 43/1972,

5. to propose an Operating Plan for specific actions related to the implementation of the Business Plan for approval of the member bodies, if necessary,

6. to discuss any questions regarding the work of ISO/TC 43 and its subcommittees, if requested by the Committee Managers, the Chairpersons or any member body.

The Advisory Panel meets at least in connection with and prior to each plenary meeting of ISO/TC 43and, on request of the Committee Manager, additionally between two plenaries at any convenient time and place.

A draft agenda is circulated as early as possible but at least two weeks prior to a meeting. Meetings will be conducted by the Chairperson of ISO/TC 43.

The Advisory Panel consists of

- the committee manager and the Chairperson of ISO/TC 43;
- the Chairpersons of ISO/TC 43 subcommittees
- a maximum of twelve experts each having a broad knowledge of the work carried out by ISO/TC 43 and/or its subcommittees and being sufficiently informed of its member body's position.

Its composition shall furthermore ensure:

1. that each major field of present activities of ISO/TC 43 and its subcommittees is covered by the special expertise of at least one Advisory Panel member,

2. that there is sufficient representation from member bodies showing a particularly high participation in Working Groups and with a good geographical spread,

3. that there is sufficient representation from member bodies providing at least two Working Group Conveners/Project Leaders.

Advisory Panel members are appointed by the Committee Manager of ISO/TC 43 in consultation with the Chairperson for a period of five years with the possibility of reappointment. Additional experts may be invited to any meeting in order to assist the Advisory Panel on specific items.

7.2 Current projects of the ISO technical committee and its subcommittees

7.3 Publications of the ISO technical committee and its subcommittees

Structure of Subject of Standards in the Field of Acoustics and Noise

Specific Technical Subjects

Acoustic quantities, units and reference values, terminology	Basic standards for audiometry and related subjects	Noise immission, determination, rating		Basic standards on the measurement description and declaration of machinery noise	Application of basic machinery noise standards to specific products (noise test codes):	Noise of all kind of vehicles, incl. measurement inside and at the work place		Recommended practice in machinery noise control	Basic standards for hearing protector attenuation	Sound propagation and noise control outdoors and at the workplace	
		Measurement and evaluation of occupational noise	Measurement and evaluation of environmental noise			Transport noise (outdoors)	Transport noise (indoors)			Sound propagation	Noise control at workplace
ISO 16 ISO 266 ISO 1683 ISO 8201 TR 25417	ISO 226 ISO 389 series ISO 532 TR 4870 ISO 6189 ISO 7029 ISO 7196 ISO 8253 series ISO 16832 ISO 21388 ISO 28961	ISO 1999 ISO 9612 ISO 11904 series ISO 22955	ISO 1996 series ISO 8297 ISO 10843 ISO 12913 series TS 15666 ISO 17201 series TS 20065	ISO 3740 ISO 3741 ISO 3743 to ISO 3747 ISO 4871 ISO 5136 ISO 6926 ISO 7574 series TR 7849 series ISO 9295 ISO 9611 ISO 9614 series ISO 11200 to ISO 11205 ISO 11689 ISO 12001 ISO 20270 ISO 2195 ISO 26101 series	ISO 1680 ISO 4872 ISO 5131 ISO 5135 ISO 6393 to ISO 6396 ISO 6798 ISO 7182 ISO 7917 ISO 7216 ISO 7779 ISO 9207 ISO 9296 ISO 10302 series ISO 11094 ISO 13475 series (ISO 22868)	ISO 362 ISO 2922 ISO 3095 ISO 3891 ISO 5130 ISO 7188 ISO 9645 ISO 10844 ISO 11819 series ISO 13471 series ISO 13472 series ISO 13473 series ISO 16254 ISO 20906	ISO 2923 ISO 3381 ISO 5128 ISO 5129	ISO 7235 ISO 10846 series ISO 10847 ISO 11546 series ISO 11688 series ISO 11691 ISO 11820 ISO 11821 ISO 11957 ISO 14163 ISO 15665 ISO 15667	ISO 4869 series	ISO 9613 series ISO/TS 13474 ISO 13475 series ISO 14257 ISO 17534 series	ISO 11690 series ISO 15664 ISO 17624

Building acoustics		
Building materials and products	Sound insulation and noise in builidings	Room acoustics
ISO 354 ISO 9052-1 ISO 9053 series ISO 10053 ISO 10534 series ISO 11654 ISO 17497 series	ISO 717 series ISO 2603 ISO 3822 series ISO 4043 ISO 10052 ISO 10140 series ISO 10848 series ISO 12999 series ISO 15186 series ISO 15712 series ISO 16032 ISO 16283 series TS 19488 ISO 20189	ISO 3382 series ISO 18233 ISO 23351 series ISO 23591

Underwater acoustics		
Measurement of UW sound from ships	Measurement of UW sound from percussive pile driving	Terminology
ISO 17208 series	ISO 18406	ISO 18405

Reference information

Glossary of terms and abbreviations used in ISO/TC Business Plans

General information on the principles of ISO's technical work