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From the History of the Noise Control Conference

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In the article a short historical outline of noise control conferences organized in Poland is given. Those conferences with the participation of Polish specialists have been organized since 1964; since 1976 they have been evolved into International Noise Control Conferences. Silhouettes of four Polish scientists, which have made a large contribution to the noise and vibration control in Poland, are presented. Also the current state of threats by noise and vibrations have been briefly mentioned. The significance of such conferences has been emphasized.

Keywords: noise, noise control, history of the noise control conference, noise threats.

1. Introduction

The NOISE CONTROL 2010 Conference is the 15th edition of the international scientific conference on noise and vibration control, organised in Poland. Although the first noise control initiatives have appeared in Poland in 1933, 1948 should be considered the official beginning of organised noise control activities. That year, Professor Ignacy Malecki initiated various activities, which have been continued for sixty years and are still taking place today. One of the effects of those actions was the first Noise Control Conference in Poland, organised by Professor Stefan Czarnecki. It seems worthwhile to commemorate the history of those conferences and the efforts, aimed at reduction of noise and vibration risks to the environment, the life, work and leisure of people, undertaken in Poland for decades. Also, a tribute should be paid to people who, regardless of the risks to their life and limb, have battled this dangerous contamination, known for over four thousand years.

2. Noise Control Conferences

National conferences on noise and vibration control have been organised in Poland since 1964, under the auspices of the Acoustics Committee of the Polish Academy of Sciences and the Polish Acoustical Society. The conference was organised by various institutions, such as the Institute of Fundamental Technological Research (Polish Academy of Sciences), the Institute of Mechanics and Vibroacoustics of the University of Mining in Metallurgy (now AGH University of Science and Technology), the Department of Acoustics of the Building Research Institute and, above all, the Central Institute for Labour Protection. At first, the participants were Polish; in 1976, the NOISE CONTROL Conference became an international event. Conferences were organised in 1970, 1973 and 1976.

In 1979, several hundred participants joined the International INTERNOISE 79 Conference, organised under the patronage of the International Institute of Noise Control Engineering (I-INCE). The conference is regarded as the fifth Polish event in the Noise Control conference series.

Fig. 1. Noise Control 76 and INTERNOISE 79 Conference Proceedings.

The sixth conference, NOISE CONTROL 82, was organised during the martial law in Poland. The title page of the conference proceedings has been presented in Fig. 2. The publishing process met enormous difficulties; arrival of a special plane with the Danish acoustic P. Brüel on board to Kraków was considered a sensation. The following facts contributed to the significance of the 1982 event:

1. On 2 September 1982, a dozen or so days before the conference opening, Professor Stefan Czarnecki died. He was one of the main organisers of the Noise Control conference in Poland.

2. A day before the conference, the "vibroacoustics" building was opened, providing room for advanced, comprehensive vibroacoustics laboratories.
3. On 23 September 1982, a day after the conference closed, the Senate of the University of Mining and Metallurgy awarded Professor Ignacy Malecki with the highest academic honour – the honoris causa degree.

Fig. 2. Title pages of the 1982 and 1998 conference proceedings.

The next conference, organised in 1985, was a significant success. Around 200 participants from around the world joined the event. Many scientists used the conference to show solidarity with Polish colleagues after the martial law ended. The grand opening ceremony took part in the Juliusz Słowacki Theatre in Kraków, led by the Minister of Environmental Protection. The "Capella Cracoviensis" group performed a gala concert in the underground St. Kinga Chapel in the Wieliczka Salt Mine. After the concert, a banquet, later remembered for years by participants, was organised in the Haluszka Chamber. The following NOISE CONTROL conferences were organised in Kraków in 1988, 1992 and 1995. These conferences were the last to be organised by the Mechanics and Vibroacoustics Institute.

The eleventh International NOISE CONTROL 98 Conference was organised in Krynica by the Central Institute for Labour Protection, the Institute of Mechanics and Vibroacoustics of the University of Mining in Metallurgy and the Polish Acoustical Society under the auspices of the Committee on Acoustics of the Polish Academy of Sciences. The motto of the conference was "50 years of noise control in Poland". It is assumed that in 1948 Professor Ignacy Malecki's initiative started a fifty-year-long series of various actions related to noise and vibration control, yielding specific results.

The NOISE CONTROL Conference was organised primarily by the Central Institute for Labour Protection. The conferences took place: in 2001 in Kielce, in 2004 in Gdynia and in 2007 in Elbląg.

The NOISE CONTROL 2004 Conference took place a couple of days before the Honorary Conference Chairman, Professor Ignacy Malecki passed away. In severe illness, Professor Malecki wrote a letter to the conference participants, saying: *In the times of fascination for computer-based simulation of phenomena, virtual images of noise protection possibilities must always find confirmation and sense in real effects and empirical verification.* In his letter, he indicated the significance of the conference for development of acoustics in Poland and its place within the new situation in the European Union.

3. Noise control in Poland

The first urban noise measurements in Poland have been conducted in 1933. The evaluation took place in Warsaw, Kraków, Lwów and Wilno. That year, by the initiative of the Minister of Communications, the Communication Company Association established the Grand Committee for Noise Control. The committee submitted its conclusions to appropriate provinces and institutions in 1936.

1948 is quoted as the beginning of noise control in Poland. Activities which should be mentioned include the work of Professor Ignacy Malecki in the Gdańsk University of Technology and the book by Professor Bronisław Bukowski entitled "Sound and construction", published in the same University.

In 1948, the Electroacoustics Laboratory of the Wrocław University of Technology, led by Professor Zbigniew Życzkowski, was founded. In 1950, the Department of Electroacoustics, led by Professor Ignacy Malecki, was established in the Warsaw University of Technology, and in 1952, the Polish Academy of Sciences inaugurated the Vibration Research Laboratory, later transferred to the Institute of Fundamental Technological Research, which conducted important research in the field of noise control. Employees of the Institute include Stefan Czarnecki, Jerzy Ranachowski and Stefan Ziemba.

In 1952, based on the Acoustics Laboratory, the Department of Acoustics and Vibration Theory of the Adam Mickiewicz University in Poznań was founded, led by Professor Marek Kwiek, as a part of the Institute of Theoretical Physics. Among others, Halina Ryffert and Antoni Śliwiński worked in the Department, which later evolved into the Faculty of Acoustics, and then – into the Institute of Acoustics. It played a significant role the development of Polish acoustics research, including noise control issues.

Ongoing research takes place in the Faculty of Technical Mechanics of the AGH University of Science and Technology in Kraków. The research includes mainly theoretical work regarding the limitation of vibration threat from machines and devices, as well as that related to vibration isolation (Władysław Bogusz).

A big role in noise and vibration control was played by the Central Institute for Labour Protection, established in 1950. The Vibration Research Institute was founded in 1956 and later transformed into the Technical Acoustics Institute, led by Associate Professor Czesław Puzyna. The Institute had significant contribution to industrial noise control. A large part of the measurements performed in real industrial conditions were the basis for interesting scientific generalisations and development of appropriate regulations and standards.

Larger-scale research regarding construction acoustics was initiated by Professor Jerzy Sadowski, within the Acoustics Laboratory of the Building Research Institute. The main activity was focused on development of methods and criteria for environmental noise assessment, evaluation of acoustic properties of construction products and facilities, acoustics-related design methods for buildings and urban solutions, as well as introduction of legal regulations regarding protection of the environment from noise and vibrations, which had to be constructed from scratch.

Rapid development of research regarding noise and vibration control in the environment took place in the 1960s and 1970s. Many scientific institutions and organisations are concerned with these issues; research is performed by Technical Universities in: Warsaw, Poznań, Kraków, Gliwice, Gdańsk, Wrocław, as well as AGH University of Science and Technology in Kraków and the Adam Mickiewicz University in Poznań and the Gdańsk University. The Institute of Mechanics and Vibroacoustics is being developed from the Faculty of Technical Mechanics of AGH. A new knowledge field emerged, concerned with all vibration and acoustics research, called vibroacoustics. Noise control work is performed by: The Central Mining Institute, the Foundry Research Institute in Kraków and the Motor Transport Institute in Warsaw. The then Science and Technology Committee established the Environment Formation and Protection Workgroup, which developed program guidelines regarding noise and vibration control. The workplace noise control program was approved by the Council of Ministers in 1971, with the Central Institute for Labour Protection as the coordinating entity. From 1975 to 1985, research was performed with regard to noise and vibration control. Numerous scientific and technical institutions conducted the work as the so-called government programs: nodal, inter-department and departmental. In 1984, the Acoustics Committee team delivered the "Noise and Vibration Threats in Poland" report. The report was submitted to the government and discussed during the National Environmental Protection Council meeting. The meeting concluded the following: "the dangers related to noise and vibration in Poland are so significant they could be called a common threat". Many people and institutions, including the Acoustics Committee of the Polish Academy of Sciences, contributed to development of high-rank regulations. These include the 1980 environmental protection and formation act and the Council of Ministers regulation for noise and vibration protection. In 1989, political changes had a major impact on the economic structure of Poland. Many plants and factories have been shut down,

other lowered production figures. Road and air transport became the biggest noise threat in Poland.

Currently, the 2001 Environmental Protection act is in force. The act has been revised a few dozen times so far and generally reflects noise control regulations of the European Union.

4. Noise threats in Poland

Based on the work of many science and research institutions and environmental protection agencies, it can be said that:

- a large part of Poland is polluted with noise, primarily transport-related;
- over 30% of citizens are exposed to noise of $L_{\mathrm{Aeq}} \geq 60$ dB;
- around 15% employees in various plants feel exposure to noise during all worktime, and 38% – for at least a quarter of that time;
- of the total of 900,000 persons employed in dangerous or strenuous conditions, around 250,000 are exposed to noise and vibration;
- only around 12% of hospital areas have good acoustic conditions;
- excessive noise exists in natural environments;
- over 54% of city citizens suffer from noise originating from external sources.

Regardless of numerous, comprehensive research work and implementations, the noise and vibration threat level in Poland has remained at the same level for many years. It is caused mainly by a constant increase of the number mechanical vehicles, with no significant increase seen in the number of roads. The expansion of airports and the increasing number of air travellers causes an increase of the number of flights on over a dozen domestic airports. The main domestic airports such as Warsaw (Okęcie), Kraków (Balice), Poznań (Ławica) and Wrocław (Strachowice) are located within agglomerations, which further increases the noise-related risks for inhabitants of housing estates located near these facilities.

The noise threat level has been presented in 2005 as a collective publication of the Committee of Acoustics of the Polish Academy of Sciences and the Central Institute for Labour Protection, entitled "Protection against noise in Poland with regard to EU regulations".

5. They should be remembered

The problems of noise and vibration control have been – and still are – being investigated by many researchers in numerous institutions. They should be remembered, and their merits shall be recalled. Such a short paper cannot include everyone deserving a mention, including Professor Marek Kwiek, Edmund Karaśkiewicz, Halina Ryffert, Władysław Bogosz, Witold Straszewicz, Zbigniew Żyszkowski, Stefan Ziemba, as well as many of you, present in this hall. Therefore, I shall only mention a few.

Fig. 3. Professor Ignacy Malecki.

Ignacy MALECKI – born in 1912 in Pakiewna, Vilnius Region. In 1935 he graduated in the Electrical Faculty of the Warsaw University of Technology, with a thesis on radiation of rotating electromagnetic fields, supervised by Prof. J. Groszkowski. He got his PhD degree in 1941, and in 1943 – the venia legendi degree: the right to lecture at universities, which analogous to the postdoctoral degree. He got the title of an associate professor in 1946, and of a professor in 1952. He got his honoris causa degrees from: Budapest Technical University (1966), AGH University of Science and Technology (1982) and the Gdańsk University of Technology (2002). Corresponding member of the Polish Academy of Sciences (PAN) (1954); full member (1958). Member of the PAN presidium (1961–1971; 1975–1980), deputy PAN Scientific Secretary (1961–1968). In 1978 he was elected vice-president, and then a honorary member of the Federation of Acoustic Societies of Europe. Honorary member of: acoustical associations of: Poland, Spain, India, Latin America; lifelong member of the Acoustical Society of America. Honorary Chairman of the Acoustics Committee and the Scientific Committee of PAN. In the 1960s, he was the vice-president of the International Council for Science Union, which is the top representation of 14 pure and natural science unions. For two cadences (1966–1971), he was the Chairman of the International Commission for Acoustics and twice led the World Acoustics Congress in Tokyo (1968) and Budapest (1972). He started his professional work in 1936, by establishing the Polish Radio laboratory, which then designed the acoustical project of the Central Polish Radio Broadcasting Station in Warsaw. After the war ended, he took part in reconstruction of theatre and concert halls by developing acoustic designs for the Polish Parliament and National Theatre halls. In 1945, he moved to Gdańsk and established the Department of Applied Electrotechnics and Acoustics at the Electrical Faculty of the Gdańsk University of Technology. In 1951, Prof. I. Malecki became the head of the Department of Electroacoustics of the Warsaw University of Technology, which he led until 1969. He was the first dean of the Communications Faculty, established in 1951; later, he became the vice-rector of the Warsaw University of Technology. He was the co-organiser

and the first director of the Institute of Fundamental Technological Research of the Polish Academy of Sciences in 1953–1962, and again in 1973–1983. During all his scientific activity, he was the forerunner of acoustics as an interdisciplinary science – his professional interests included construction and architectural acoustics, electroacoustics, hydroacoustics, ultrasound technology, physical and quantum acoustics, and recently acoustic emission. That broad spectrum was reflected in the topics of his publications, including 11 monographs and around 230 papers, among which one of the most noteworthy is "Physical Foundations of Technical Acoustics", published by Pergamon Press, Oxford (1969) – a handbook valued in many countries. Other unique publications include "Theory of waves and acoustical systems" (1964; in Polish) and "Theoretical Foundations of Quantum Acoustics" (1972; in Polish). Didactic work resulted in supervision of 25 PhD dissertations. Professor Malecki also performed numerous non-scientific activities, such as leading the UNESCO Department of Scientific Policy (1969–1972), integration of Polish acoustics by establishing and becoming the first chairman of the Committee of Acoustics in the Polish Academy of Sciences, as well as the establishment of the Scientific Committee. The work of Professor Malecki has been appreciated. He was the chairman of the Scientific Committee of the Mechanics and Vibroacoustics Institute of AGH-UST in Kraków. He won National Awards in 1952 and 1966 and received a number of national and foreign distinctions, including the Order of the Academic Palms (France, 1983). He died in Warsaw on 12 June 2004.

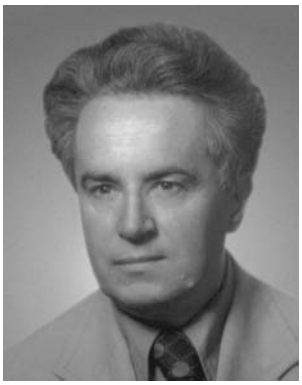

Fig. 4. Professor Stefan Czarnecki.

Stefan CZARNECKI – (1925–1982). Since 1945, he studied at the Gdańsk University of Technology. In 1949, he graduated from the Electrical Faculty, and after finishing his thesis entitled "Scaling dynamic microphones using the reversibility method", received the Master of Science degree. After several years of work in the Central Polish Radio Laboratory and at the Warsaw University of Technology, in 1953 he began work in the Analogy Department of the Institute of Fundamental Technological Research (Polish Academy of Sciences). Later, he be-

came the chairman of that department. In 1959 he received the PhD degree, after defending a dissertation entitled "Irregularities of acoustical waveforms in closed spaces", and in 1965, the postdoctoral dissertation "Cooperation of Helmholtz resonators with a surrounding centre". In 1966, he got the degree of senior lecturer. In the years 1963–1974, he worked in the Institute of Automatics, then in the Institute of Organisation and Management, and later again in the Institute of Fundamental Technological Research, as the chairman of the Department of Aeroacoustics. In 1972, he became associate professor, and in 1980 – professor.

The 30-year scientific work of Prof. S. Czarnecki resulted in over a hundred published papers concerning aerodynamic sound generation, noise control in industrial spaces, interior acoustics, acoustic screen theory, sound source identification and transmission ways of acoustic energy. Professor Czarnecki was part of a group of researchers, who initiated and organised various actions related to noise control in the environment.

He represented Poland on numerous congresses and scientific conferences concerned with acoustics. His achievements include organisation of the Second Federation of Acoustical Societies of Europe Congress in 1978, and of the International INTER-NOISE'79 Conference. He co-organised the NOISE CONTROL 82 Conference in Kraków.

For many years, he was the Scientific Secretary of the PAN Committee of Acoustics. He co-founded the Polish Acoustical Society. He established the "Archives of Acoustics" journal and became the editor-in-chief in 1966. Since 1974, he edited the English edition.

He was considered the true spiritus movens of the Polish acoustics society and was enjoyed enormous respect.

He died on 2 September 1982.

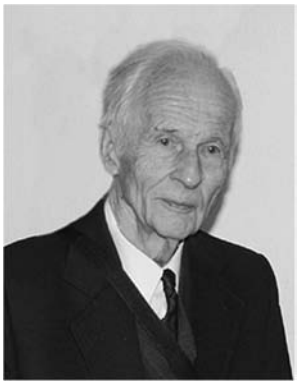

Fig. 5. Professor Czesław Puzyna.

Czesław PUZYNA was born on 8 December 1920. He graduated in 1948 from the Mechanics Department of the Gdańsk University of Technology. He got his

PhD degree from the Scientific Committee of the PAN Institute of Fundamental Technological Research in 1984. At first, he worked in the Institute of Mechanisation and Electrification of Agriculture, and from 1951 – in the Central Institute for Labour Protection. In 1956, he established led the Vibration Research Department, later transformed into the Department of Acoustics. Within the department, he performed research regarding measurement methods and evaluation criteria for noise and vibration in the environment. Thanks to his research, the vibroacoustic threats on various workplaces in the Polish industry have been identified. The work of Czesław Puzyna also concerned development of various technical solutions for reduction of noise in the industry, including sound-absorbing ceiling and wall systems, specialty suspended ceilings, sound-proof cabins and enclosures for machines and devices, industry acoustic screens and ventilation system mufflers. He has also done research on the influence of the acoustical properties of the environment on the spatial orientation of humans. As a result, architectural and design guidelines have been developed to optimise the spatial orientation conditions, as well as design/construction requirements regarding auxiliary rehabilitation equipment, allowing blind people to navigate in terrain. He took part in numerous scientific conferences and symposia, both domestic and international, giving talks which always won recognition. His contribution to development of Polish standards regarding acoustic problems is especially noteworthy. He was the author of unique monographs concerned with noise control in industry, as well as numerous publications in various scientific and technical journals (over 100 publications). For many years, he was a member of the Acoustics Committee of the Polish Academy of Sciences. He worked in the Polish Acoustical Society and the Noise Control League. He died in Warsaw on 11 December 2003.

Fig. 6. Professor Jerzy Sadowski.

Jerzy SADOWSKI was born on 18 December 1924 in Augustów. He graduated from the Electrical Faculty of the Gdańsk University of Technology, and from the Communications Faculty of the Warsaw University of Technology. He got his

PhD degree in 1962, and his post-doctoral degree in 1973. He became associate professor in 1973, and professor in 1980. After graduating, he worked in various institutions, including the Broadcasting Design and Study Office in Warsaw. Since 1959, he worked in the Building Research Institute in Warsaw, as chairman of the Department of Acoustics.

The department, led by Professor Sadowski for almost half a century, played a fundamental role in the development of architectural and construction acoustics in Poland.

In the Building Research Institute, Professor Sadowski created complex acoustics laboratories with specialised equipment. A set of specialist echo chambers was constructed to research the isolation of walls and their elements, such as doors and windows. Laboratories were set up to evaluate acoustical properties of construction products and systems, with unique research workspaces.

6. Conclusion

The NOISE CONTROL conferences have contributed to the fight against one of the most dangerous threats in human life and work environments – noise and vibration. These conferences were originally organised for Polish participants; later, renowned foreign scientists joined the events, which gathered several hundred researchers in total. Participants could not only give talks and take part in discussions, but also learn about the newest scientific developments, research methods and measuring equipment presented by manufactures from all over the world.

The conferences popularised the noise control issues, but also contributed to enhancement of the prestige of noise-related research, giving it the rank of one of the most important and promising fields in acoustics.

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