HKIOA NEWSLETTER
November 2001 ISSUE

Sounding Board

香港聲學學會
The Hong Kong Institute of Acoustics

MESSAGE FROM THE CHAIRMAN

Dear Members,

We live in a major metropolis that seeks to respond quickly to changes. And we would all admit that our world is changing very rapidly, be it on the military, political, social, economical, or technological fronts.

The HKIOA is also re-positioning itself in the midst of changes and development. We are cultivating more opportunities for our members to expose themselves more widely. We are setting up working groups to look at issues that may affect the future practice of the profession. We are renewing our links with sister organizations within the region. We are contributing to the continued development of young engineers while introducing them to the acoustics profession. We are again joining hands with the Institute of Vocational Education to train much needed "new blood" for the industry.....

On the topic of change and development, you will also recognize that we are continuing with our efforts to bring you a better newsletter with this edition of the Sounding Board. We are doing this not just for the sake of change alone but, more importantly, we hope to create closer ties between the Institute and you. At the same time, we hope to bring more information (as well as value) to you via the printed medium.

If you have comments or suggestions on how the Institute could serve you better, please drop us a line. We are here and we are listening (and acousticians could listen well).

Ir. Richard Kwan
Chairman

MESSAGE FROM THE EDITOR

Y.N. Au Yeung

The August issue of Sounding Board was out and probably you were aware of the difference between that and the previous ones. How do you feel about that new style? Write to us and express your opinion. We are waiting for your feedback. It is YOUR newsletter and improvement cannot be made continuously without your input.

Besides the report on past activities, we continue the Elite Club with "Perceptive of the Acoustic Profession: Academics". Four guest speakers from different disciplines/institutes shared their views on the topic. Members can have an idea about the academic world and their insights.

We have support from two members to the Members' Talk corner. They shared with us their happenings and experience. The message from Mr. James Wong is very inspiring. We are overwhelmed by the impact of IT nowadays while the importance of engineering is undermined. This situation exists both in the industry and in the academic sector. We, as practising personnel in the engineering related field, should give a thought to this issue and re-position ourselves for better development and future of the profession.

We need 'life' in our newsletters. Do write to us, either in English or Chinese. How about your interest and hobbies? We are waiting but don't let us wait too long!

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TECHNICAL TALK ON "TIME-DOMAIN COMPUTATION OF ACOUSTICS"

Maurice Yeung

The HKIOA has great pleasure to invite Professor FUNG Kee-ying from Department of Mechanical Engineering, Hong Kong Polytechnic University to talk to the members on 17.10.01 (Wednesday) in the Auditorium of MTR Headquarter.

Prof. Fung delivering his talk to audience.

Prof FUNG joined the Hong Kong Polytechnic University in 1997 as Professor and leader of the Dynamics and Control Group in Mechanical Engineering. His research interests span across several disciplines including Acoustics, Aero-acoustics, Aerodynamics, Applied Mathematics, Computational Mechanics, Environmental Noises, Active Noise Controls, and Thermo physics. He has been a book editor and published many articles in archival journals and book Chapters. His latest endeavours are active noise control, impulsive noise, wave computation and parallel computing. Apart from active participation in acoustic research, Prof FUNG is currently leading an effort in aviation education and training for Hong Kong.

Maurice presenting souvenir to Prof. Fung

Prof FUNG outlined the basic theory of time domain numerical solution. He gave a brief account of how to treat or consider the boundary conditions, which inevitably introduces inconsistencies and mismatches to a numerical scheme, and how to allow waves to rebound truthfully from the ends and remain intact. Prof FUNG also reviewed the advantages of a dimensionally split formulation and demonstrated the effectiveness for long-time stable phase-and-magnitude accurate computation of waves in bounded domains with a distribution of wave sources and various types of forced and unforced boundary conditions. Before the talk ended, Prof FUNG presented a very interesting demonstration with the aid of computer modeling on the duct and room acoustics and outdoors sound propagation.

The members attended found the talk and the demonstration very interesting and insightful. Many questions were raised with regard to the fundamental approach and further applications.

香港聲學學會探訪廣州市環境科學學會[1 & 2.11.01]

[報告人：楊國良]

Group photo of representatives of both institutes.

本年十一月一及二日，姚景光、楊國良，陳兆根博士及鍾偉樑代表本會探訪廣州市環境科學學會。此行目的是為促進港穗兩地噪音控制同業的技術與經驗交流。其實，廣州市在這數年大力發展道路、鐵路及橋樑等基礎建設，十分注重噪音控制，在新建成的市內環路也建造了很多聲屏障，數量之多直追其他大城市。我們得到穗方的熱情招待，並安排與廣州市地下鐵道設計研究院交流，獲益良多。為了讓彼此能夠再次作學術及經驗交流，也好讓我們投桃報李，一盡地主之誼，我們誠意邀請廣州市環境科學學會於明年三月組團前來香港訪問。

[HKIOA representatives visited the GuangZhou Environmental Science Society to promote the noise control technology and activities in both cities.]

Members of both institutes at banquet.

8th INTERNATIONAL CONGRESS ON SOUND AND VIBRATION (2 - 6 JULY 2001)

Dr. K.M. Li

The eighth International Congress on Sound and Vibration (ICSV8) sponsored by the International Institute of Acoustics and Vibration (IIAV) was held successfully from 2 to 6 July 2001 at the Hong Kong Polytechnic University. The Hong Kong Institute of Acoustics has actively participated in organising this important event in Hong Kong. The Congress was part of a sequence of congresses held in the USA (1990 and 1992), Russia (1993 and 1996), Canada (1994), Australia(1997), Denmark (1999) and Germany (2000), each attending by several hundred participants worldwide. It was the first time the event was hosted in an Asian city - Hong Kong, China. The Congresses have enjoyed a strong support from a broad spectrum of professionals such as academia, research scientists, and engineers working on vast areas of acoustics and vibrations. It was of no exception this year as we saw registrations of over 410 delegates representing 37 countries from Africa, Asia, Europe, North America and South America. The Mechanical Engineering Department of the Hong Kong Polytechnic University was the host of the event.

Main organisers of the event: K.M. Li (right) & Maurice Yeung (left)

HKIOA display corner at Congress venue

Richard Kwan introducing HKIOA to delegates at Congress Banquet.

HKIOA members at Congress Banquet.

The opening ceremony of the ICSV8 was held on 3 July 2001 at The Hong Kong Polytechnic University. We had the honour of inviting Professor Poon Chung-Kwong (The President of the Hong Kong Polytechnic University) to deliver a welcoming speech. Members of the Scientific Committee worked hard to organise an excellent programme. After the opening ceremony, 8 lecture theatres were set up for parallel sessions. A total of over 400 first rate technical papers catergorised in about 100 sessions was arranged covering many different research areas. The sessions included many interesting topics ranging from environmental noise to aeroacoustics, from machine tool vibration to the state-of-the-art active vibration control, from speech processing to auditory mechanics, from engine exhaust and inlet systems noise to room acoustics, from statistical energy analysis to major challenges in structural-acoustic optimisation. In each session, a time slot of about 20 minutes was allocated for the presentation of each paper. All sessions were well attended by delegates. In addition to these contributed lectures, 6 invited Distinguished Plenary Keynote Lectures were arranged also. The Keynote Lecturers were Glenn Frommer (Hong Kong), Hanno Heller (Germany), Jing Tian (China), Jie Pan (Australia), Anders Nilsson (Sweden) and Hiroshi Wada (Japan).

With the busy technical programme, the delegates were also offered with exciting social programmes thanks to the devoting efforts of the Local Organising Committee and Congress Secretariat. The entertainment comprised of a Lion Dance performance during the Lunch break on 3 July, a Congress Banquet on the evening of 3 July. Delegates were given a choice of enjoying a lively cruise at Victoria Harbour on either 4 or 5 July. Unfortunately, Typhoon Utor visited Hong Kong that led to the cancellation of the harbour cruise on 5 July but delegates still enjoyed a view of Victoria Harbour as a buffet dinner was arranged. Because of the Typhoon, all lectures scheduled for presentations on the last session (morning of 6 July) of the Congress were cancelled. Nevertheless, the Organising Committee wishes all delegates enjoyed the technical as well as the social events and had the most memorable stay at Hong Kong.

* Ir Dr Alex CHAN on curtain wall system;
* Ir KK IU on acoustic treatment for radiator plants; and
* Mr Zane AU on ice rink sound system

Curtain Wall System for External Noise Abatement

Ir Dr CHAN has revealed that the curtain wall system of the Festival Walk consists of two main areas, the office curtain wall and podium glass walls and roofs. Laminated glass of two layers of 6mm heat strengthen (HS) glass with 2 layers of 0.76mm PVB inter-layer was adopted as the vision and spandrel glass of the office curtain wall units. The STC rating of the glass is 39dB.

There are major elements of the unique glass walls and roofs of the Festival Walk. These include Glacier (roof and wall), Canyon (roof and wall), River (roof) and End (wall). For the Glacier roof, an insulated laminate glass with outer layer of 6mm + 0.76mm PVB + 6mm, an air space of 12mm,and inner layer of 4mm HS + 2 x 0.76mm PVB + 4mm HS was adopted. The STC rating is 43dB. For the other roofs and walls, a laminated glass of 10mm + 0.76mm + 6mm was adopted. The STC rating is 40dB.

Acoustic Treatment for Radiator Plants

Ir IU introduced to us that 44 sets of outdoor air-cooled vertical discharge package-type radiator were installed at the podium level of Festival Walk in 1997.

The predicted results indicated that the noise level at the NSR would be 20 dB(A) higher than the EPD requirement. Acoustic enclosures consisted of duct silencers and modular type acoustic panels were then designed and installed to eliminate the noise nuisance. Drain channels were also constructed to collect rainwater fall onto the rooftop of the acoustic enclosures.

There are totally 3,000m^3 of silencers and 4,000m^2 of acoustic panels to form the enclosures. This is believed to be the largest acoustic enclosure in a building project in Hong Kong.

Ice Rink Sound System

Mr AU briefly explained the fundamental approach in designing a sound system. He then elaborated further the set-up of the ice rink sound system (consisting of top and front speakers, control console etc.), the design process and the on-site testing procedures.

He also enlightened the participants some tips and pitfalls in designing the sound system for such an entertaining area. The usual difficulties encountered, as Mr AU said, are that the interior design and the usage of the nearby areas would not be fixed until the very last minute. This inevitably causes hiccups to the original sound system design and changes at last minutes would unavoidably become necessary.

The members attended found the visit informative and useful. Many questions in relation to the design considerations were actively raised during both the visit and the lunch afterwards. In particular, discussions were held on the noise insulation measurement methodology of curtain walls and glass walls and acoustic performance of laminated glass and insulated glass.

Professionals sharing their views with members.

Group photo taken on podium roof of Festival Walk.

Souvenir presentation to representative of Swire Properties.

hard core engineering solutions. The gap between the two aspects is too wide to be filled by just a part-time short course. This would leave more opportunities for academic institutes to cope with the change.

Mr. Albert Li

This change in mindset is perceived slow compared with safety. The public had already been aware of the importance of safety in late eighties. The enforcement of EIA in late nineties was an important move. In fact, the spirit of EIA is not just taking field measurement and subsequent remedial action. The feedback of the knowledge and experience gained is utmost important in the process. Academics can play an important role in this technology transfer.

Strengthening the industrial link is another task. The link with industry in the form of research and development is still weak in recent years. Some isolated cases have been initiated but the process is slowed down by the economic downturn. Another observation is that people tend to employ overseas consultants instead of local ones. This attitude or approach should be changed to have local academics involved. The image of the tertiary institutes can then be enhanced for further collaboration and development.

The research activities in universities are of basic and applied nature. The latter requires a strong backup from the industry. In fact, there can be a win-win situation. Quoting the noise planning as an example, the engagement of academics by property developers in carrying out land use study can help to make best possible use of sterilised lands. The consultancy fee involved is only a very minor portion of the investment expenditure.

Having considered the nature and size of the market, the role of academics in the acoustic field is mainly supportive. It is considered that the noise policy has to be reviewed by the Government so that various parties, including the public, can have a clear picture years ahead. Academic institutes can then plan accordingly to suit. In the mean time, academics can help to educate the public through normal (full-time courses) and supplementary (short courses, workshop and seminars) training. Participation in professional institutes and offering of social services would be ways to enhance the image and status of the profession.

Conclusion

The noise and acoustic industry is relatively small in scale that the demand from industry is limited. A full-time dedicated course in this field is not financially viable. The associated elements can only be included as part of an environmental or engineering course. Part-time postgraduate or short courses would help to provide specific in-depth training to satisfy the needs of industry. Nevertheless, the concept of life-long learning should be clarified and not be over-emphasised. Besides, the importance of environmental monitoring and control and their relation should be highlighted. The mindset of individuals should be changed to be more environmental and noise conscious. Finally, stronger link with industry together with appropriate applied research and development projects would help to promote technology development and subsequent fostering of the profession and the status of academic institutes.

TECHNICAL VISIT TO FESTIVAL WALK

Andy Chung

Group photo taken near the ice rink.

It was a beautiful, sunny day on 3rd November 2001. It was warm out there, but even warmer inside the Festival Walk when the crowd of HKIOA members were getting together, enjoying their hot coffee, and got themselves ready for the technical visit.

This visit would not be made happened without the support of Swire Properties Ltd and Festival Walk Management Office. In particular, the representatives from Swire Properties, Mr Wong and his colleagues, were all very enthusiastic in touring us around the Festival Walk. From familiar places like the ice rink to those rarely accessible such as the podium top, we were introduced to places where we had the opportunities to appreciate in person various aspects of the intelligent acoustic designs incorporated into this building to contribute to the better, quieter environment.

We were pleased to have the following professionals who were involved in the design and implementation of these acoustic provisions to share with us their experience during the visit:

The concept of life-long learning seems overwhelming. The requirement to have a sound foundation in the development of a personal career has sometimes been neglected. It is observed that some youngsters have only practised in their field of work for a short period. Their basic knowledge and training is still inadequate. They should focus on strengthening their current stage of career development. Unfortunately, they tend to spend more effort to prepare for further advancement. This lack of step-by-step approach probably results from the social pressure created in the territory. The education system in Hong Kong should be reviewed.

In recent years, the advancement in information technology is so rapid that IT teaching and e-learning have to be applied in the education sector. Time has to be spent to develop the related teaching materials. The workload will be increased and individuals have to strike a balance. The main emphasis is still on conveying knowledge to students and to develop industrial link for students' benefit.

Dr. C.M. Mak (Left);
Dr. K.M. Li (Right)

Perception of Industry

The focus of the industry tends to shift from primarily monitoring to control. Efforts have been placed to translate the consultancy report into practical design solutions. Engineering control is becoming more demanding. This is the natural transition from the introduction of the Noise Control Ordinance (NCO) in late eighties to the enforcement of the Environmental Impact Assessment Ordinance in late nineties.

Monitoring and control are equally important but problem exists in the interaction between EIA consultants and contractors. In some consultancy reports, no detailed consideration is given to the practicability of the proposed mitigation measures. Contractors submit their bids largely to get the contracts without full consideration of the proposals. They sometimes find it difficult to satisfy the requirements laid down in the reports and to challenge the proposals.

It is necessary to find ways to enable contractors to realise their responsibilities before submitting bids for contracts. The inclusion of an implementation schedule at the end of EIA reports is considered useful. It helps to provide a summary of the things to be achieved, the rationales behind, the ways to achieve the objectives, the schedule of activities and the responsibilities of various parties concerned. This facilitates contractors to arrive at more realistic bids from voluminous proposals and document. The chance of having successful completion of projects with minimum disruption will largely increase.

The knowledge and attitude of site staff is in general considered not adequate. They tend to treat noise as a nuisance only. Noise control provision is mainly the result of legislative requirement. The attitude can be reflected to a certain extent by their relatively low participation in noise control related workshops and seminars. Besides, only large corporations and projects will involve environmental managers to ensure compliance and promotion of noise control. The attitude of senior management in most companies is not very positive, as shown by repeated violations of the NCO by the same company. Low penalty might be another reason. The situation improves after it becomes the personal liability of management in committing offences.

Role of Academics

The lack of educated manpower employed in the field hinders the implementation of noise control measures. There are cases in construction companies which employ a small number of site safety or environmental engineers. Each officer or engineer has to take care of several sites with the assistance of a site manager. The ultimate burden then rests on a foreman who may not be fully aware of the importance of environmental related issues.

Appropriate training to these front line personnel can be of immediate help. In fact, talks with the related contractor association about the introduction of short courses have been started. The possibility of providing a progression ladder for further education can be pursued further. The awareness of the needs by industry calls for a greater demand on the academic institutes in offering the necessary courses.

It is generally agreed that on-the-job training with more specialised subsequent study is more suitable for the acoustic industry. The size of the market cannot afford a full-time dedicated undergraduate course. It can only be a stream of a more general engineering or environmental course. The existing part-time postgraduate diploma course may be more suitable than a master degree course. The self-financed nature renders a very high tuition fee, which makes the course less attractive even though it is academically viable.

The approach of using short courses to bridge the gap in the industry has also been used by the academic institute to train safety officers of environmental issues. However, there is a trend to separate the safety from environmental management because the former deals more with the soft elements while the latter is more related to

ELITE CLUB #18

Perspective of the Acoustic Profession: Academics

Guest Speakers: *Prof. K.C. Lam, Professor, Department of Geography and Resource Management; Director, The Centre of Environmental Policy and Resource Management, The Chinese University of Hong Kong.*
Dr. K.M. Li, Associate Professor, Department of Mechanical Engineering, The Hong Kong Polytechnic University.
Mr. S.S. Li Albert, Senior Lecturer, Department of Applied Science, Hong Kong Institute of Vocational Education (Chai Wan).
Dr. C.M. Mak, Assistant Professor, Department of Building Services Engineering, The Hong Kong Polytechnic University.

Facilitator: Ir. Y. N. Au Yeung, Chair, Publication Sub-committee, HKIOA

(Note: The paper includes the opinion of the guest speakers and it does not represent the view of the Institute.)

Prof. K.C. Lam

Acoustics Education in Hong Kong

The local education in the acoustics and noise area started in the seventies in the Department of Mechanical Engineering in the University of Hong Kong. Prof. Norman Ko took an active role in the associated research and development, including the study on jet noise. He undertook an extensive survey on roadside traffic noise and the effects of aircraft noise on teachers in schools. His findings had a significant influence on the adoption of sound insulation for classrooms following the establishment of the Environmental Protection Department in 1976. He also successfully supervised many research students who are now renowned professionals in the acoustic field. The Hong Kong Polytechnic University is another tertiary institute, amongst others, who has been very active in noise and vibration. The Departments of Mechanical Engineering, Civil Engineering and Building Services Engineering have been offering courses and researches in environmental and building services noise. Many resources have been injected in recent years including the building of large-scale reverberation and anechoic chambers. The trend is likely to continue. The Chinese University tends to concentrate on environmental impact assessment and environmental planning. The training of technicians lies heavily on the Hong Kong Institute of Vocational Education (IVE), which is a large provider of environmental related sub-degree graduates. It can be considered that more focussed effort is being developed in various tertiary institutions.

In the past and recent years, acoustics has seldom been offered as a standalone course. It has been included as part of a course such as mechanical engineering, civil engineering, building services engineering or environmental engineering. The main reason is that the market demand does not justify a full-time engineering degree course. Besides, it would be considered too narrow a spectrum for the graduates in the field of environmental management. The situation is similar to that in UK. Previously three programmes in acoustics existed and they supplemented each other. Unfortunately because of the reduction in demand, one department was closed down while the other is now under great pressure to recruit enough students. In USA, only one undergraduate programme exists in this field. On the other hand, a part-time course in the acoustics area may prove viable. More than ten years ago, a part-time day release associateship course in noise and vibration control was offered. Graduates would satisfy the academic requirements for corporate membership of the UK Institute of Acoustics. In the same period, a distance learning master of science degree course in the same field was offered by a UK university. Eventually, these two courses ceased to operate. In recent years, a part-time professional diploma course is being offered jointly by HKIOA and IVE to satisfy the industrial demand.

Perception of Teaching Profession

People in general complain about the decline in student quality in Hong Kong. Yet, it is considered not appropriate to make direct comparison with other countries. Students from different courses will have their own specialties and characteristics. Teaching should be tailor-made to suit individual requirements and to enable individuals to make best use of their strength and to have a proper perspective. It is a value-added exercise.

来友专栏 Members' Talk

I went back to the United States last November and have been working in Oklahoma State since last December. Although I got several offers from other states, I preferred to live here. My company is a manufacturing company, which designs and manufactures the inlet and exhaust system of the gas turbine engines. I am the acoustic expert and the only Chinese in this company. This position requires strong background in fluid flow and acoustic principles. Sometimes, I need to go to other states to work with the customers. Up to now, I have handled over 90 projects for my company.

Mr. W.P. Ko in US.

Last December, the weather was very unusual in Oklahoma. It snowed every day. Also, tornado occurs frequently in spring and summer. The main entertainments here are hunting, golf and fishing. Every Sunday, I go to the church with my family. I have learnt to trust God.

There is no word to express the sadness in my heart about the tragic event in New York on September 11, 2001. I hope that this kind of events will not happen again in the world.

I shall have time to spend my vacation in Hong Kong next year and I am looking forward to seeing all of you.

[Contribution: W.P. Ko]

"800Hz, 2.6° & -.- dB"

"800Hz, 2.6°", I shouted the figures. EEEEEEEE ..... I remembered it well, it was May, 1983. I was in a UK laboratory doing modal testings on a turbine-generator main shaft. The shaft rings like a siren when the forcing frequency approaches the shaft's natural frequency with a phase lag at 2.6°. The shaft weighs about 4.5 tonnes and the vibrator was just about the same size as a small biscuit tin. It was the first time I physically felt the power of mechanical resonance. The input force to the shaft was very low but everyone in the laboratory had to wear ear defenders due to the extremely high intensity of structure borne sound radiating from the shaft. After completing the modal testings, special journal bearings were designed to dampen the shaft's vibration and the whole assembly was tested in a rotation test rig. The shaft and bearings were tested to a rotational speed of 12,000 rpm. The laboratory crew was sitting behind a 1.2m thick concrete wall with equally thick layers of glass to a view window, downloading data and observing the test. During a test in the past, there was an incident where a small component took off and was found in the carpark 100m outside the laboratory, it had penetrated the roof slab!

Working in a dynamics laboratory was very busy. We had to do run down tests (for machine condition checks), design electronic low pass filter systems for data acquisition, seismic tests, write software programs, install accelerometers on generator sets leaving the factory and provide 24 hours on-call trouble shooting services to all power stations.

Symphony hall with design criteria of PNC-0.

My life as a mechanical engineer was very interesting until my colleague told me his design criteria was PNC-0 for a symphony hall. It was December 1985. I was in a UK design office. "I beg your pardon", I said, "there are two old railway tracks just 13m beneath the site. The trains are mostly diesel inter-city trains going to or coming out from the station.....". "Silence is part of the music too." My colleague explained. Four years later, we were alone, watching the display of the sound level meter in front of us in the symphony hall, "-.- dB". With all systems running, at 1000Hz and above, the sound level meter did not show readings below 5dB. We looked at each other and smiled. It was well after midnight but both of us were so excited about the results. Four years of careful analysis and design, scrupulous attention to details, and well, boxes of correspondence and detailed drawings.

Working as a consultant in the building industry has been very rewarding - at least on the technical front. I can apply my knowledge in mechanical engineering and learn more about human scale and people.

Our skills can be applied to a very wide range of industries. This is even more true today with China joining the WTO. The knowledge has grown so much and it is up to us to apply this knowledge in every practical aspect. It is not what we do once in a while that counts, but our consistent actions. And what is the father of all actions? What ultimately determines who we become and where we go in life? The answer is our decisions. It's in these moments that our destiny is shaped. More than anything else, I believe our decisions - not the conditions of our lives, determine our destiny. I hope that this article contributes to such an understanding.

[Contribution: James W. H. Wong]