



HONG KONG INSTITUTE OF ACOUSTICS
COMMEMORATIVE EDITION OF SOUNDING BOARD



10th Anniversary
2003
十週年



香港聲學學會



十週年紀念特刊





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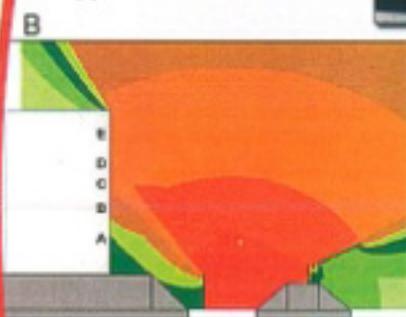
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A Permanent and portable noise monitoring system

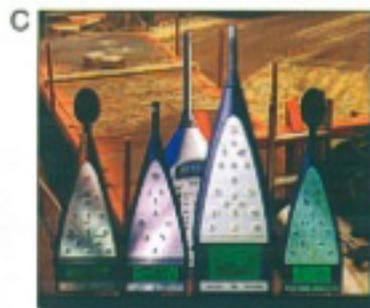


B Large scale noise modeling and prediction

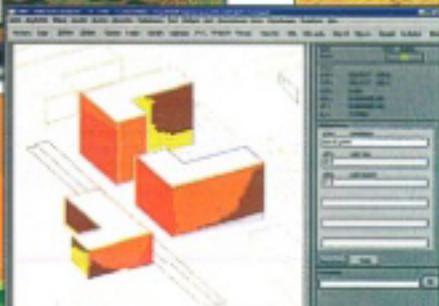
- Vertical noise contour showing façade levels in situation of multi-barriers and podium
- 3-D display on façade levels



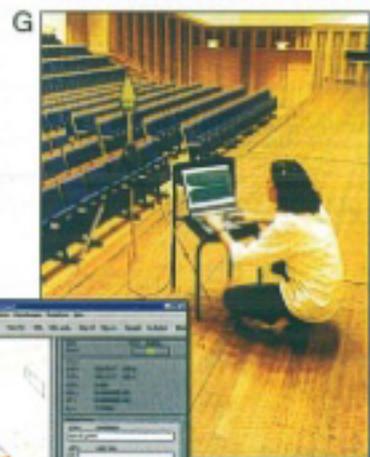
C Family of Sound Level Meters and Analyzers



D Building acoustics equipment (sound sources, tapping machine etc)



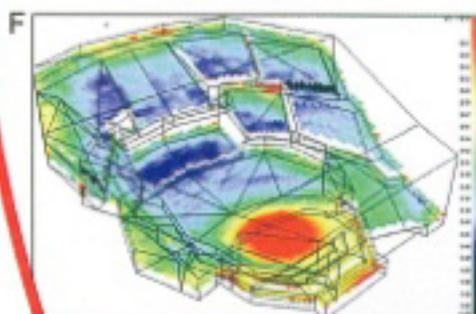
E Family of 24 bit Pulse analyzers (a flexible platform to meet your measurement requirement - e.g. noise source location, sound quality, material testing, recorder, vibration analysis...etc)



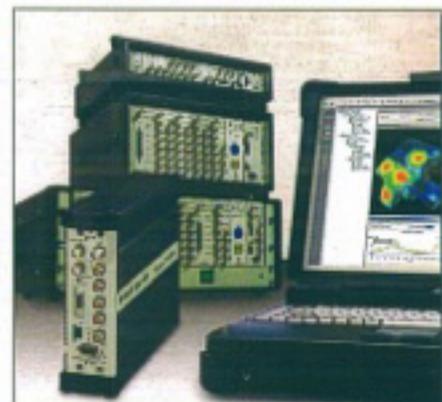
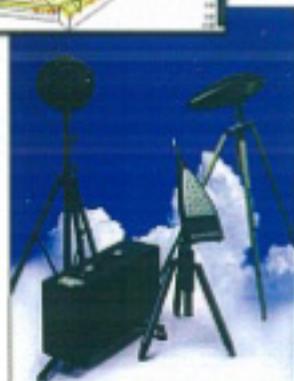
F Odeon - Modeling software for room acoustics

G Dirac - PC solution for room acoustics measurement

- Room parameters ISO 3382- EDT, T20, T30, C80, D50
- Stage Parameter- STearly, STlate, STtotal
- Speech ISO 60268-16 - RASTI, STI



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Harmonie

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Salto system

Long Term Remote Monitoring of Noise Climate

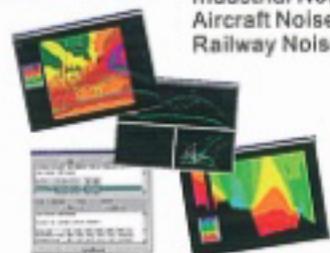


SOLO + GSM
Medium Term



Maestro

Human Vibration meter



Mithra - Prediction Software

Road Noise Module
Industrial Noise Module
Aircraft Noise Module
Railway Noise Module

ONO SOKKI



LA-series

Sound Level Meter

G.R.A.S.



Microphones & Accessories

Prism Sound



dScope Series III

Audio Test & Measurement System

TEAC



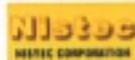
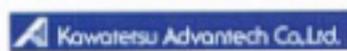
Multi-channel Recording unit

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SH-2000

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Sound & vibration Problems

Contact S & V Samford

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graduates was awarded the PD course certificates and the graduation ceremony was held in June 1998.

Graduates of the Course are recognised by HKIOA with the necessary achievement in Acoustic education for the appli-

cation of the Corporate Membership.

Although the Course is financially independent of HKIOA (up to now, there are no financial implications on HKIOA), the ExeCom has given continuous support in terms of professional talks given by

HKIOA members. A close liaison has been maintained by the Education Sub-committee with the IVE Administration.

The Course has been successfully run with great contributions from academic staff including Prof Clarke, Patrick Fung, Albert Li, C T Wong, and our members including Richard Kwan, K O Chan from EPD and W M To.

來友聲
Members' Talk

A Message from Abroad

W P KO in the States

This year is the 10th Anniversary of HKIOA. I am very happy to write an article for all of you. Last year, I had a business trip in England for several weeks. Before I left England, I saw a very interesting statement in the Newcastle Airport; "Time flies like an arrow, fruit flies like a banana". It is very true that time flies like an arrow. I have left all of you for several years. I am very thankful to the farewell party organized by HKIOA before I returned back to the United States. I recall that the weather in that December was very unusual in Oklahoma State. It seemed to welcome my return!

I want to make use of this occasion to share with you my experience in noise control as a lure to foster further dialogue among members.

Silencer design for the gas turbine engines is very interesting and challenging. Vortex shedding is also an important factor in silencer design. Some of the exhaust stacks are installed with parallel rods between two opposite walls inside the exhaust stacks to reduce wall vibrations. As it turns out that in a certain operating power, the frequency of the vortex shed-

ding of the rods coincides with the first transverse mode of the exhaust stack and creates tonal noise. This is a typical dipole source of flow noise which will increase as the sixth power of the flow velocity at a constant Strouhal Number. The tonal noise can be reduced by decreasing



the flow velocity, or avoiding installation of any obstruction inside the exhaust stack. Besides the noise problem, the stack height design is also required to meet the Federal and State air pollution requirements. This year, I did a very special project. I reduced the radiated noise which was a dominant source due to the vibration from the steel deck of a vehicle. The basic principle is that the energy in

response of structure decreases as one over the square of the damping loss factor at resonance and that the response to broadband excitation is inversely proportional to the damping loss factor. In my computing work, I also included the loss factor due to the attachment of the steel deck

with other moving parts of the vehicle. Based on my conclusion, a viscoelastic damping layer of around 2 mm thick covering on the external surface of the steel deck can reduce 5 dB at 500 Hz, which is a dominant frequency due to vibration in this case. This

computing technique can be applied for the noise control of an automobile design.

I went to the Angel Island to spend my vacation this year instead of coming back to Hong Kong. I hope to see all of you next year.



Meyer Poon Memorial Award

Dr Westwood HONG & K K IU

Meyer Poon was an early acoustician in HK's consultancy after graduating from Hong Kong Polytechnic University in 1982 and later served in the EPD Noise Policy Group under Raymond Chan and Sam Wong. He was described by Sam in 1994 at a presentation ceremony in the presence of Meyer's parents as 'a very hard working chap'; Meyer could often be found staying late in the office to get his work finished as he was very conscientious to complete every mission. After years of service in the acoustic consultancy and EPD on noise policy and control, he passed away in the middle of his youth on 3 November 1993 following a short spell of attack from malignant tumours.

In 1994, while considering winding down and running in parallel for the first year with the newly formed HKIOA, the IOA (UK)'s HK Branch has put aside the accumulated fund of about HK\$80k for educational purposes. The first ExeCom of the HKIOA raised a suggestion to set up an award to tertiary graduates for submitting a thesis relating to Acoustics.

Raymond Chan first raised an enquiry

on the prospect of setting up a memorial scholarship. The proposal had been discussed and approved by the HKIOA and IOA(UK) ExeCom(s) and the Meyer Poon Memorial Best Student Project Award evolved. Raymond later proposed to name this award in memory of our young acoustician Meyer.

Details of the Award was announced in 1994 with the Objective of 'The Award

aims at encouraging tertiary students to study acoustics, noise and vibration, and thus facilitating their project supervisors to perform applied research work in these areas.' In addition to the Award, the winners receive a certificate and one-year free student membership of the HKIOA.

The first Award went to Mr Kwan Man Kim on a report titled 'Improvement to Laboratory Experiment'.

Over the years, more than 27 Awards have been presented to bright students and several of our members have offered their precious time in accessing the submission including Sam Wong, Daniel Chan, Maurice Yeung, K K Iu, Raymond Chan, Westwood Hong, F S Cheung, Tom Ho, Gabriel Lam, W M To, Tommy Wan, CM Mak, N C Cheung, Martin Chan, Andy Chung, Y N AuYeung, Aaron Lui, Glenn Frommer, Richard Mui, Richard Kwan, etc.



Dr Hong and KK Iu with the Myer Poon Memorial Award Winner in 2002

Professional Diploma Course in Acoustics and Noise Control: Joint effort between HKIOA and IVE (Chai Wan)

Dr Westwood HONG & K K IU



A lecture of the course in 1998

In around 1995, the Associateship Course in Acoustics and Noise Control

being run in PolyU was about to be discontinued after years of being the educational centre to offer a useful course to Higher Diploma holders for obtaining the specialised education in acoustics.

The ExeCom of HKIOA was very concerned about this unfortunate decision made by the PolyU as it was

about to concentrate on offering degree courses. HKIOA wanted to run an equivalent acoustic course in case the only acoustic course in HK available to people inter-

ested in Acoustics and with a full-time employment would be discontinued. Several academic institutions were approached and three of them expressed interest in organising such a course: Open Learning Institute (OLI), IVE (Chai Wan) and Hong Kong Productivity Council. The ExeCom visited these Institutes to have a preliminary assessment on their facilities and intended programmes. After a careful consideration, the very keen IVE was finally selected to run the Professional Diploma course in Acoustics and Noise Control (the Course) with the first intakes started in 1996. The first batch of 15



Members - A Valuable Asset to the Institute and the Acoustic Profession

It has been my pleasure to serve the Institute as Chairman of Membership Sub-Committee since the 2002 AGM. The Membership Sub-committee has been, in fact, playing an important role in uphold-



Members' participation in technical seminar & visit in 2001

ing the professional and ethical standards of the HKIOA members. By maintaining stringent membership requirements in both academic training and practical experience in responsible work relating to acoustic field, the Institute is able to ensure not only the professional standards of the HKIOA members, but also integrity of the acoustic profession in Hong Kong.

Indeed, starting with a few founding members in 1993, the Institute has now about 194 members. Among them, 22 are Follows, 123 are Corporate Members, 45 are Associate Members and 4 are student Members. Many of them are working in

Dr Kin CHENG
Chairman, Membership Sub-Committee

consulting firms, utility companies, railway operators, academic institutes as well as government departments. Through properly organized events and technical seminars, the Institute has been providing members with opportunities not only to exchange contacts but also to share their valuable experience in acoustical applications relating to their own disciplines.

To look ahead, the Membership Sub-Committee is hoping to streamline the membership assessment procedure and to continue to attract newcomers from diversified disciplines. I believe this would help enrich the culture of the Institute and bring in acoustical knowledge from different areas.

Use of Information Technology

Andy CHUNG
Chairman, IT Sub-Committee



Indeed, it has been my great honour to have the opportunities serving the HKIOA as the Chairman of Information Technology Sub-Committee since the 2002 AGM. The Sub-Committee has been advocating the use of information technology to improve the efficiency and effectiveness for the communication within the Executive Committee and that with the fellow members. For example, we have been posting e-flyers onto the HKIOA official website to make announcement of upcoming events. We have been publishing reports and photos on the website for members to review. We have also started sending out e-flyers by e-mails in parallel to our traditional mailing channel to keep our members informed of the Institute activities.

Since 10 April 2002, the HKIOA official website has been given a new name - HKIOA.ORG. Since then, members can get access to the latest news, upcoming

events, activity reports, photo galleries and electronic version of Sounding Board all by visiting <http://www.hkioa.org> with an ordinary web browser such as Internet Explorer. A web site is often an important front to an organization. It is therefore important in the promotion of the organization that the title of the web site has a relevant, easy to remember domain name. HKIOA is the acronym for the Hong Kong Institute of Acoustics, and .ORG reveals the non-profit status of the organization. This is how the domain name, HKIOA.ORG, was derived. We are pleased to have secured the identity of HKIOA on the Internet as a professional and trustworthy organization.

We have also been promoting our newly named website both locally and internationally. For example, we have registered for free at the leading international search engines such as Yahoo, Google, MSN, Lycos and Hotbot. As such, the HKIOA web site is top-listed for queries using key words "acoustics, profession, Hong Kong". We have exchanged links

with other professional organizations such as HKIE YMC, etc. Every month, there are hundreds of visitors coming to use the HKIOA website. On average, each visitor spends about 3.3 minutes browsing 4.8 web pages. The general feedback reveals that "Photo Gallery" is the most popular section.

To celebrate our 10th Anniversary, the Sub-Committee has made an attempt to dress up the website by creating a dedicated web page with a new logo, designed by Ir Dr Gabriel Lam (Thanks!) Looking ahead, the Information Technology Sub-Committee is hoping to streamline the materials collection and publishing process for the website and make it more user-friendly and informative. We shall continuously advocate the use of e-mails as a cost-effective and environmental friendly channel to communicate with members.

Last but not least, I would like to take this opportunity to thank all the committee members who had, throughout the year, supplied timely web contents including photos, reports and flyers, to keep HKIOA.ORG fresh and up to date.



Get Prepared - More to Come

Diary of an Environmental Manager

- 8:30am Weekly meeting to discuss the progress of designing a new railway link. Key issues on the agenda - operational noise affecting performing venues and construction noise affecting residential premises.
- 10:00am Review draft EIA. Outstanding items - noise from tunnel boring machine and wetlands ecological survey.
- 11:00am Site check on the progress of full scale mock up noise test.
- 12:15am Phone call from the Director asking for an explanation on the significance of Area Sensitive Ratings under the relevant Technical Memorandum of the Noise Control Ordinance.
- 2:00pm Meeting with Engineering Team to develop alternative noise mitigation measures for Environmental Permit submission purposes.
- 3:35pm Phone call from the Construction Manager seeking clarifications related to indirect technical remedies.
- 4:15pm Phone call from the specialist consultant enquiring on the status of his noise assessment that was submitted last week.
- 4:30pm Phone call from a resident of XXXX asking for predicted noise reduction values associated with the acoustic louvres now under construction in front of his block.
- 5:30pm Dry run of presentation to Senior Management on the need to incorporate additional noise mitigation measures as a result of changing design parameters.
- 7:35pm Phone call from the Director chasing for the completion of a groundborne noise assessment report.

Dear fellow Members,

Many of us, including me, in the acoustical and noise control profession would more prefer a place in the background rather than in the limelight. But on so many occasions, willingly or unwillingly, we are ushered onto centre stage because noise is a key concern these days.

Having the opportunity of serving you and the Institute as Chairman has broadened my exposure as well as further equipping me for the many assignments that are in front of me. Thank you for allowing me to grow with you as we all seek to contribute to the community as well as to the advancement of the profession.

Congratulations to the HKIOA and the membership as we celebrate the Tenth Anniversary of the Institute.

Richard KWAN
Chairman (2000 - 2002)



Photo: Delegation visit to Shanghai in 2001



pedite and streamline the approval process for development proposals, submission of traffic noise calculation endorsed by the members of HKIOA was one of the requirements. This is very encouraging as the professional significance and valuable contribution of our fellow members is well recognized. This is further reflected as some commercial tenders also require acoustic submissions endorsed by the members of HKIOA.

Going regional, the HKIOA decided to host the tri-annual Western Pacific Regional Acoustics Conference (WESTPRAC) in November 1997. The WESTPRAC provided a main forum for scientists, acousticians, engineers, architects, developers, planners and industrialists worldwide to meet and exchange experiences in the fields of acoustics and noise control. It was our honour to have Mr. Robert Law, Director of EPD to de-

liver the opening speech. We had also invited world-renowned acousticians Dr. George P. Wilson, Dr. George S. K. Wong and Prof. H. Tachibana to give keynote speeches. The conference was well attended by over 150 delegates.

Although it was not an objective to raise fund in the conference, we got a healthy balance of profit at about



"Visit to Acoustical Society of Taiwan in 1997". Happy faces after lunch at the University of Taiwan.

HK\$250,000. It was just an encouraging reward after lots of hard works by the Organizing Committee members. This also greatly increases the asset of the Institute and supports her future growth.

To conclude the recapitulation perfectly, I must thank all members for their support. Last but not the least, my appreciation to the committee members' contributions and devotion to the Institute, Westwood Hong (Immediate Past Chairman, 96-98), Albert Li (Hon Secretary, 96-97), Maurice Yeung (Hon Treasurer, 96-97 & Hon Secretary 97-98), F. K. Wong (Hon Treasurer 97-98 & committee 96-97), Tommy Wan (96-98), Daniel Chan (96-98), Tom Ho (96-98), James Wong (96-97), Alex Leung (96-97), Glenn Frommer (97-98), Stephen Lau (97-98), Andrew Cheung (97-98) and Nelson Tam (97-98).

HKIOA - The Institute for Local Acoustic Professionals and Practitioners

Congratulations!

The Hong Kong Institute of Acoustics is celebrating the 10th Anniversary.

Being a fellow member of the Institute, I am proud of the achievements in the past years. The professional developments and advancement of local acousticians are well taken care of through seminars and technical talks scheduled regularly. There are also programs and courses like "Meyer Poon Memorial Award" and "Professional Diploma Course in Acoustics and Noise Control" to promote acoustical knowledge in tertiary education. We also participate actively in commenting on policy related to acoustics and noise control. With the dedicated efforts and contributions from the members, the Institute has established firmly a solid foundation for the local

acoustic professionals and practitioners to develop and grow.

Thanks to Raymond, Westwood, Daniel, F S and many other senior fellow members who made the right decision in 1993 to establish a learned institute for the local acoustic professional and practitioners. Without their insightful idea of setting up an independent professional institute for the local professionals, we may not be able to witness such flourishing achievements.

As Hong Kong is facing un-precedent change of economic situation and development mode, the local acoustic professionals and practitioners would undoubtedly be affected. With the tremendous booming economic growth in the Mainland, many of our local professionals would find their future and fortune in the Mainland. The Institute would likely

see its next important task to provide assistance and channel for our professionals to establish the networking and connections in the Mainland. Obtaining recognition of our professional status and experience by the Mainland Authorities could possibly be one of the Institute's imminent works. I look forward to seeing further achievements by the Institute.



Delegation Visit to Environmental Protection Department of Taiwan in 1999

Maurice YEUNG
Chairman (1998 - 2000)



representation of silencers and vibration isolators in the 70's. The installation of air-cooled chillers with spring vibration isolators in a small hospital in Fanling in 1977 was probably first of its kind. In late 70's and 80's, owners, designers and contractors were able to incorporate noise control and mitigation measures into the system design and equipment selection.

Talking about planning, I would like to share with you my experience in the

Tin Shui Wai and Yuen Long areas in the early 80's. The background noise levels for the perimeter of a development area of over 30 sq. km were conducted for a period of 48 hours. There were many dogs! I play tribute to those who participated in the first full scale noise survey of a development area in Hong Kong.

With the establishment of the EPO in the 70's then EPD later, I am pleased to say that the noise pollution and control ac-

tivities have been successful. Thanks to the noise professionals in both the civil service and the private sector. I would encourage professionals to pay special attention in the layout and positioning of buildings and also direct mitigation at source such as tunnels, covering depressed roadways etc. No more single aspect buildings!

Transformation from UKIOA to HKIOA

Back in 1989, Raymond Chan from EPD initiated the reactivation of UKIOA Hong Kong Branch. Following the successful operation and hard working of the committee members under the leadership of F S Cheung, Westwood Hong and Daniel Chan, the membership increased from the initial 30 to over 150. Though there was little help from the parent organization, the committee managed to recover some surplus of over HK\$85,000 from Westpac II.

With the imminent return of Hong Kong sovereignty to China, it was discussed and agreed that a local Institute of

Acoustics be set up in 1993. In order to make way for the rapid growth of HKIOA membership in Hong Kong, a special emergency general meeting (EGM) in 1995 agreed to dissolve the accommodated two Institutes of Acoustics. The special EGM also agreed to transfer over HK\$85,000 as an education funding and seed money for HKIOA.

The study of history is important as it unfolds the origin and laid down cornerstone for the significant development of the future. The UKIOA Hong Kong Branch had done that. It brought many colours and lights to the later formation

of HKIOA. The HKIOA continues to prosper and will never stop to shine lights on all acoustic matters in Hong Kong.

*Prof Daniel P C CHAN
Chairman (1993 - 1995)
IOA UK Hong Kong Branch*



Delegation Visit to Shanghai in 1994

Message from the Founding Chairman of HKIOA

A phone call in 1989 from Raymond Chan changed my life and paved my road on sharing the long and lasting joy with the Acoustics society in Hong Kong. In Raymond's EPD office, FS Cheung, the two Daniel Chan(s), Raymond and I were enlightened with the situation and given the task of re-activating the HK Branch of the IOA of UK. It was unanimously agreed that HK had the need of an Acoustic society since the Branch had not been active for some time after most Branch committee members had been working outside of HK.

The HKIOA cannot be what it is today without the UKIOA HK Branch reactivated in 1989. It was fun as we did not have the finance and most of us were fresh, at least for me just returning to HK after a long spell of 15 years in London. Serving as the first Honorary Treasurer, the immediate task was for me to retrieve the hidden gold locked up in the bank. I went to the HSBC head office with the new Chairman, F S Cheung, to negotiate the re-opening of that dormant account. We were shocked to find in the account

only two thousand odd dollars because we had been told by those who had successfully organized an earlier WESTPRAC conference that the bottom line was much more impressive. As it turned out, the balance had been very responsibly held in an account within the PolyU which was the hosting institute of that wealth generating conference. We could not have repossessed the money, though, if not the help of Albert Li of the PolyU who assisted in convincing the University that we were

*Dr Westwood HONG
Chairman (1994 - 1996)*



people crossed paths and soon were working together for a vision: a local and autonomous learned society that could map its own agenda of contribution to the community. The time was ripe.

In a small cafe on the M floor of the Evergreen Hotel in Wan Chai, some of those people sat down to discuss what would turn out to be the constitution of the HKIOA. Many more meetings went on. People worked hard organizing things. Finally HKIOA came into being and Westwood Hong became the founding Chairman. Soon, Gabriel Lam designed the logo. The rest was history.

The story I just told has many names in it. I do not intend to glorify them. I just wanted to show that they were part of the historical fabric of our profession and our institute. The professional activities of these people, as well as their contribution towards the field of acoustics and noise control, intertwined to form a tapestry - one that tells the story of our profession most vividly. The following "current

status," often taken for granted, owed much to their hard work and dedication:

- o The growing membership and healthy finance of the HKIOA are indisputable facts. The members of the HKIOA made it that way.
- o Many regional administrations took a page from Hong Kong's noise barrier experience after ten years of exchange visits. The members of the HKIOA made it that way.
- o Noise abatement designs for ventilation equipment for offices, restaurants, and tunnels, once afterthoughts, have now virtually become standard features. The members of the HKIOA made it that way.
- o Our high-speed trains meet the most stringent requirements comparable to any where in the world. The members of the HKIOA made it that way.
- o Our internationally renowned

conference facilities all have first class flexibility and quiet. The members of the HKIOA made it that way.

- o Tens of thousands of school kids can learn in reasonably quiet classrooms. The members of the HKIOA made it that way.

Space does not permit me to go on but many of you could perhaps continue to tell this story as you gather to celebrate the anniversary. I am sure as you relive and retell the story, you will feel certain warmth, almost pride, about what you have collectively achieved over these years, not just for the HKIOA but also for the community. I am sure you feel encouraged to continue to make contributions in your professional endeavors so that whoever it is in another ten years to tell the story, will have much more materials to keep the audience fixated.

I have finished telling the story. It is time for us to walk on to the set and perform.



As a Fellow and Founding Member of the Hong Kong Institute of Acoustics, I am very pleased to be invited to contribute to the special Sounding Board issue in commemoration of the 10th Anniversary of the Institute. In this article, I would like to go back to the 70's and share with you the situations in Hong Kong in terms of noise pollution and noise control.

Following the wake of economic developments beginning late 60's, the activity levels of Hong Kong began to increase. These included infrastructure, transport and community. The construction of the Cross Harbour Tunnel was commenced in 1968 and the tunnel was open to traffic in 1972. The initial phase of urban lines of MTRC, the Modified Initial System was also completed in 1979 for the section running from Kwun Tong to Tsim Sha Tsui, and later across the harbour to Central in early 1980.

Air transport was also booming. The

Noise Pollution and Noise Control in the 70's

Dr Alex CHAN

Fellow and Founding Member of HKIOA

recently de-commissioned Concorde first visited Hong Kong in 1975. Extension programmes to the single runway, connecting bridges, aprons had been continuous till the late 90's.

The population in Hong Kong in late 60's was about 4 million and had since then increased at a rate of about 1 million per decade. Public and private housing had been developed at a very fast pace to cope with the increasing numbers and standard of living.

With these activities in the 70's, Hong Kong was very very noisy. First to quote a few examples. Whenever an aeroplane was about to land "Kai Tak 13 Runway" during the day time, school teachers delivering classes underneath the flight path had to temporarily stop. The serious noise intrusion to residents at night was only temporarily hault from midnight till early morning. Heavy traffic noise along the elevated road structures of the East Kowloon Corridor had let to permanent closure of residential windows.

In early 70's demands of airconditioning to commercial land uses began to surge. Without proper planning and plant room areas, we often saw air-cooled chillers being located within close proximity to openable windows of residential units at podium roof. Of course, complaints of noise nuisance and heat were received and the department at the time responsible for the licensing of restaurants and other commercial operations, the Urban Services Department, was responsible to deal with those complaints. You may wonder how the noise complaints were dealt with. First, the acceptable noise criteria. In the absence of regulatory control on all noise sources, a "5dB above background noise level (in dB(A))" was adopted. Some senior officers in EPD could tell you more about how difficult and interesting the old days were. All these triggered the use of noise control products and installations and also proper planning of plant room for airconditioning. I was party to product



was considered. The findings indicated very high noise levels that teachers suffered severely from noise.

Even with scientific data, it took me a few years of campaign and persuasion, before the Government agreed to carry out a small pilot study on 10 schools. Eventually, the Government adopted the policy and allocated substantial funds, in different phases, in improving the environment inside hundreds of schools, against aircraft and road traffic noise.

Every time I passed a school in Hong Kong, I am happy that I have done my tiny share, in providing a better environment for our younger and future generation.

am. Categorically, I can classify myself as an acoustician, a fluid dynamist, a sculptor, a painter, an engineer, an environmentalist and an underwater photographer. Secondly, I can also consider myself as an aerodynamicist, an aeroplane modeller and a photographer. I can further vaguely say I am a lover of classical arts and civilisation. I might consider myself as a jack of all trade, only knowing a little bit of the things I am interested in. However, this is not exactly true either.

Under the modern classification, though I know who I am, I really do not know which category I belong. Throughout my life, I tried to do the things, which interested me. In vain, I have not achieved what I wanted to achieve. It is a very depressing thought indeed!

To comfort myself, the modern categorisation is not really important and necessary. If I spent so much time and energy in classifying myself into different categories, I may not have enough time to do what I want to do. However, though I may not achieve as much as other people do, my way of life does give me great self-satisfaction and happiness. This is my destiny.

In the ancient Greek era, the 'philosopher' involved himself in the different

fields in which he was interested. They could be philosophy, science, astronomy, mathematics, logic, dialectic, experiment, religion and others. It was through his inquisitive mind in all these areas that shaped the Greek civilisation, the civilisation of the Renaissance and the civilisation of the modern world.

In the Renaissance, those who left their marks in the history of human endeavour had also to be versatile within different fields. They could excel in different areas. They could be sculptor, painter, engineer, architect, inventor, musician, physicist, botanist, anatomist, geologist, geographer, fluid dynamist and others at the same and different time. It was what they achieved, even in different fields, which mattered.

After all these years, I now realise the reasons why since childhood, I love the ancient Greek civilisation and the Renaissance. I have the feeling that I was borne two thousand years too late. In those flourishing environments, I would have enjoyed more, as the contemporary fellow man attempted to do things, which interested them. My motto might better suit those environments.

In this twenty-first century, even though I cannot determine what exactly I am, does it really matter?!



Working on full sized model,
MOTHER AND CHILD

Retrospectively, as I have such diverse love affairs, I do not really know what I

A Great Story to Tell

All civilizations have stories. Moon cakes, rice dumplings and red packets are symbols of stories familiar to Hong Kong. These stories help us remember and draw us to participate in the tradition.

At the 10th anniversary of the HKIOA, I am here to tell our story. And it began way back at the pre-HKIOA period when only the UKIOA-HK Branch existed.

There were only a few members of the UKIOA then. Actively involved in education and consultancy practice were Professor Norman Ko, Ian Campbell and Andrew Shillinglaw, all of the HKU. Their consultancy practice, together with Cemac, Radio People, and certain government departments were the few ongoing professional concerns that dealt with matters of noise control and acoustics. Soon more acoustics experts arrived, as a re-

sult of **Government emphasis** on the environment. These included Terry Wilson and Fred Mak from the UK, Lex Brown from Brisbane and Rob Law from Melbourne. The landscape of professionals in this field began to take shape.

But the full picture must depend on the growth of local talents to complete. At this time, young local engineers, mostly trained under Professor Ko, entered the scene. They included Andrew Kwan, Daniel W T Chan, Alex Chan, K K Kan, F S Cheung, K K Iu, Simon Hui, Joe Kwan and Maurice Yeung, working in government, colleges and mostly building services related private practices. Meyer Poon learnt the trade from Campbell and Shillinglaw; Stephen Lau worked on the architectural side in HKU, and H F Chan began his career in the then

EPA.

As if things were meant to be, about the same time, there was a steady stream of professionals who were trained overseas returning to Hong Kong to work in the field of acoustics and noise control. These people included the following who were UK trained: Wai Fong Ho, Yiu Kei Kam, K S Chan, P S Ng, K O Chan, K M Lo, Sam Wong, Simon Hewitt, Alvin Leung, Nick Boulter and Westwood Hong; Daniel P C Chan and Gabriel Lam from Australia; Richard Kwan and Tom Ho from Canada. The increasing number of infrastructure projects in Hong Kong also brought experts like Glenn Frommer and others from the States and Europe. These

Raymond CHAN





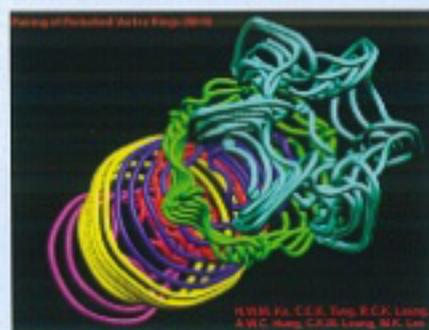
on the modal characteristics and phase relationship between the vortices.

The interaction between a sharp edge and a single jet results in the resonance of the latter, producing high sound emission. With two-dimensional jet, edge tone is formed and is the mechanism in the sound production of wind musical instrument. With circular jet, I found that much higher Mach number was required before resonance set in. The higher intensity sound is due to feedback mechanism, exciting more intensely the initial instability layer.

My theoretical and experimental studies established that the basic mechanism of sound generation of single jet is associated with the acceleration and deceleration of the interacting coherent structures or vortices. This new concept provides a useful tool in the understanding and control of the sound generation of air jet. The more recent studies further indicated the sound emission at different frequencies is due to the interactions and the changes of shape of the interacting vortices.

The initial vortices of air jet are subjected to three-dimensional disturbances. Their interactions may be vastly different. The recent theoretical simulations of two weakly perturbed interacting vortices of different wave numbers established the stable and unstable modes of interaction, depending on wave number. The sound emission, therefore, depends on the mode, with the unstable one emitting much higher sound.

The theoretical simulations on the interactions of two and up to four trains of vortices confirmed that their interactions result in either amplification or attenuation of sound emission, depending on the types of interaction.



*Unstable mode interaction of two weakly perturbed vortices
Wave number $m=6$*

I am not going to cite the theoretical and experimental studies on the interactions of vortices of coaxial step cylinders and of side by side and staggered cylinders and their effect on the wake, such as bistable flows. Nor am I going to cite the recent findings on the basic mechanism of transition of cylinder wake. The small-scale vortices, as generated by the separated shear layer, affect the formation of the large-scale Strouhal vortices. This new and important finding explains the transition of cylinder wake into different flow regimes with the change of Reynolds number.

Nor am I going to cite the findings on the effect of sound and vibration on heat and mass transfer. Nor will I describe the effect of grooves, such as the placoid scales of shark, on the lift and drag of cylinder. Active control, by introducing sound, of the boundary layer on the cylinder was also attempted for the manipulation of the wake.

In 1995, based on research achievement, the University of Hong Kong conferred me a Doctor of Science.

After more than thirty years of research, it does seem I raised more questions in the areas of fluid dynamics, aeroacoustics and noise pollution. Though I published extensively, with more than 240 publications, in international journals and conference proceedings, the University retired me, even after such a long and loyal service!

When I came back from England, Hong Kong had no knowledge on environmental noise. Nobody complained about the aircraft noise from the Kai Tak Airport. Nor people complained about traffic noise. As Hong Kong very rapidly became the biggest construction site in the world, nobody complained about construction noise, not mentioning the neighbourhood noise.

The Government did not consider noise as an environmental issue. On one occasion, the Director of Public Work stated in the press that for progress we had to accept noise, such as that of impact piling. Hong Kong was in a very sad state.

I started to campaign against noise and against the lack of action by the Government. Without realising it at the

time, I had started a new industry in Hong Kong, now employing thousands and thousands of people!

Without any control and with all these old and ancient machinery used, Hong Kong, even without any scientific data, could very well be imagined the noisiest city in the world. With the help of my former students and volunteers and without any financial support, unfortunately, I found Hong Kong the noisiest city in the world. This is one discovery, which I am not proud of.

In 1975, I did the first ever social survey, without any funding, of the subjective responses of 1200 Chinese, out of a population of 1.3 millions, within the areas under the western approach to the Kai Tak Airport. Out of these 1200 Chinese, 909 persons older than 21 years replied to the seven-page questionnaire. The Noise Burden Factor for the Kai Tak Airport was 42.5, compared with 16.5 for the London's Heathrow, 5.4 for that of Newark and 1.22 for that of Los Angeles.

In the 1970s, I suggested the relocation of the airport. Even with the help of many people in Hong Kong, it took more than twenty years before the Government agreed to build the new airport.

Every time I used the new airport, I was filled with elation. It is gratifying to know that the people in Hong Kong can finally enjoy some quietness from the aircraft noise.

I am not going to cite my objective and subjective surveys of 552 fireman at 12 fire stations on the effect of aircraft and road traffic noise. It is also gratifying that because of the study, funding was approved by the Government to improve the noise environment in fire stations.

As the aircraft, traffic and construction noises were so intensive and widespread in Hong Kong, one could image their effect on schools, teachers and students. In 1977, I did the objective and subjective surveys on teachers and the effect on teaching. A total of 139 schools, 61 secondary and the rest primary, located within the areas under the western and eastern flight paths were chosen. 2100 Chinese teachers from 91 schools responded to the questionnaires, 44 percent of the total teacher population in the ar-



flows by short pulses. In the evening, as I had not yet adopted the British culture of going to pub, I joined a stone carving course in the Cambridge College of Art and Technology. Thus, by chance, I started another love affair.

I thoroughly enjoyed the 20 hours course. It enabled me, at last, to carve the classical style marble statues; similar to the ones I loved since childhood. Fortunately, the tutor let me do what I wanted to do. What he taught was the technique of carving and the use of basic tools. The freedom of creation allowed me to open another chapter, really a fantastic one, of my mad life.

When I came back to Hong Kong, I set up my working area in my flat, which belonged to the University. With my expertise, I incorporated vibration isolation and took every measure I could think of, including public relation, trying not to disturb the 'sensitive' academic neighbours. I was not very successful. On one occasion, I was 'falsely' blamed for, with the heavy loads of all my sculptures and the vibration of 'hand' hammering, cracking the building. The Estates Office did seriously consider in dismantling and rebuilding it!

After I started my artistic life, a reporter very politely asked me that as I was more than forty years old, there would not be much time left for me to be an artist. My answer was that based on the average life span of male in Hong Kong, there would be more than thirty years. It is the span of a working life!

With another mad and exciting love affair, I found my time was hopelessly insufficient. Even though I became a nocturnal animal, on top of my daytime academic work, I had to assess my time allocation. As my artistic activities might become self-financing, while diving was catastrophically ruining my finances, with much regret, I had to terminate my love affair with the butterflyfish and angelfish.

In 1987, the French Government invited me to study the French art and science. As I was staying in my French friend flat and could not do carving, I started doing acrylic painting. At the age of forty-nine, I did my first ever painting. It was also very enjoyable.



IN MID OF WATER,
acrylic on canvas, 61 x 51 cm, 1987

Later, in Hong Kong, I sold this first painting. It made me a very happy man indeed. In 1991, I held my one man painting exhibition in the French Cultural Service, French Consulate, Hong Kong.



SKY IS THE LIMIT,
*painted stainless steel, height 18 m,
1994, Hong Kong Stadium*

As I have learned the technique and knowledge of engineering before my artistic life, I can go for whatever materials and techniques, which fancied me, in producing a sculpture. This gives me choices, and more importantly, the freedom to do what I want to do.

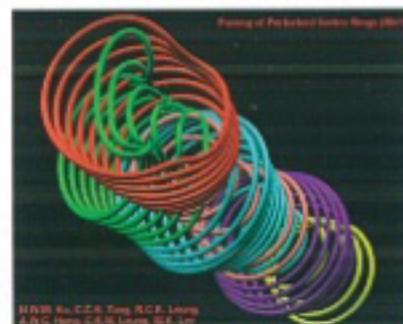
I started having commission in doing large and monumental sculptures for private and public places. Because of high



WINGS, bronze, Oi Tung Estate,
1.3 x 1.8 x 1.8 m, 2002

wind condition and corrosive environment, I used more durable materials, such as bronze and stainless steel, for these sculptures. The biggest one is the geometric sculpture, *Sky Is the Limit*, 1994, for the Hong Kong Stadium. It is 19 metres high. The five pieces stand erectly and independently, having only a footing of 400mm x 500mm. I tried to go to the limit of engineering, withstanding the severe typhoons in Hong Kong.

Recently, I have finished five big bronze sculptures for the Towngas Avenue, Causeway Bay, The Hong Kong and China Gas Company Limited.



Stable mode interaction of two weakly perturbed vortices, Wave number $m=1$

Even though I was commented in spending more time underwater than above, I did spend some time in the University, doing researches on my favourite topics. My Ph. D. study identified and established the presence of coherent structures in the initial region of low speed air jet. These coherent structures were then found in most fluid flows, advancing significantly their basic understanding.

In Hong Kong, I studied the much more complicated coaxial jets of different diameter ratios and velocity ratios and the interactions of different coherent structures. The studies simulated the bypass aircraft gas turbine. The effect of the additional train of coherent structures on the flow development was found to be dependent on their complicated interactions. The sound emission is then dependent on the types of interaction.

The interactions of the coherent structures of annular jet, especially those of basic annular jet without the centrebody, are much more complicated. Different modes of interactions result in different modes of the induced vortices formed. The decay of these different vortices depends



very fascinating subject. My love rapidly turned into madness, resulting in making, as fast as I could, different types of model aeroplanes. In the earlier years of my secondary school, I managed to sell them. I set up a very 'small' private business, in batch producing the aeroplanes. I did make quite a profit.

Very naturally, I wanted to be an aeronautical engineer. In Hong Kong, the future of that profession was non-existent. I, then, decided to be a mechanical engineer.

Regrettably, because of the pressure of time on study and on my other commitments, I had to wind up my model aeroplane business. From Form 3, I started spending an appreciable part of my leisure time in reading books on the aerodynamics of aeroplane and the mechanical aspect of aeroplane and helicopter, in preparing myself for the future.



1700 plastic model aeroplanes as the medium for one of my installation arts

Nearly fifty years later, I rekindled my love of aeroplanes. I used about 1700 plastic model aeroplanes, which I have assembled in the last five years, as the medium for an installation art in my recent one-man exhibition held in the Hong Kong University of Science and Technology.



Greek marble statues of Hellenistic period on frieze of Great Altar of Zeus at Pergamon, Turkey, c. 180 B.C., Pergamon Museum, Berlin

In my third primary school, I discovered, to my great joy, the school had a library. I soon became the pupil, who most frequently visited and borrowed books from the library. Regrettably, I also soon became the one, who paid most fines for late return of books.

Besides aeroplanes, I unearthed another world. I read books, in Chinese of course, on the ancient Greek myths and legends, on the Greek history, on the Greek sculptures and on the Renaissance. I found the Greek gods were just as bad, not too dissimilar from some of my fellow classmates and the persons I knew.

I started another love affair, the love of ancient Greek civilisation. I admired the marble and bronze sculptures of the Greek and of the Renaissance.

One could imagine that I could not afford the leisure and did not have the enjoyment, which other normal children had. After all these years, it now dawns on me that I did not really have a normal childhood.

My love of the Greek civilisation did not diminish with time, even after my decision to become an engineer. In Forms 4 and 5, I started reading Greek philosophy, comedies and tragedies, in English of course. I enjoyed the Homer's Iliad and Odyssey. As they were so complicated and difficult, I got lost most of the time.

I was moved by the love poems of the poetess Sappho of Lesbos and the odes of Pinder of the 7th to 5th centuries B.C. I admired the dialectic teaching of Socrates and the prose of his pupil Plato around the 5th century B.C. I tried, without success, to understand his philosophy and his *Republic* on the ideal state. Plato's vision in founding the Academy, which was in effect the first European university, impressed me. I was saddened by the historic work of Thucydides on the Peloponnesian war and on the wane of the Athenian influence.

I, then, realised the significant impact of the ancient Greek civilisation of more than two thousand years on the Roman, on the Renaissance, on the present Western civilisation and on the world.

My Ph.D. study in England gave me the opportunity to appreciate the richness of the Greek and Western civilisation in

person. The museums and their cultural traditions impressed me and gave me greater insight. In every country, in every city and in every village in Europe, I felt the richness of the environment, the buildings, the museums and the people. These are the experiences, which I will never forget.



Low relief on the frieze of Parthenon, Athens, Elgin Marble, British Museum, London

Later, when I travelled to other continents, I started enjoying the richness of other civilisations, such as that of the ancient Egypt, Babylon, Persia, India, China, Maya and others, though not as much as that of the Greek.

Before I ever dreamt to be an artist, I was long impressed by the Elgin Marble, 447-432 B.C. in the British Museum, London. The collections of the free standing sculptures in the pediments, of the high relief of the metopes and of the low relief on the frieze of the Parthenon, superbly done by the sculptor Pheidias, enabled me to feel more intimately the grandeur of the ancient Periclean Athens. My visits to the ruins of the magnificent Parthenon, Athens, forced on me the great achievement of human being, more than two thousand years ago and the intimate interaction between the architects, Ictinus and Callicrates, and the sculptor, Pheidias in producing such a masterpiece for mankind.

Of course, I loved the marvellous marble statues of the Hellenistic period, *Venus de Milo*, c. 150 B.C. and the *Nike from Samothrace*, c. 200 B.C. in the Louvre, Paris. The notable high relief statues on the frieze of the Great Altar of Zeus at Pergamon, Turkey, c. 180 B.C., Pergamon Museum, Berlin, really awed me with its grandeur.

The Renaissance sculptures impressed me. The monumental and large sculptures of Donatello, Verrocchio and



Our Objectives

- * To promote the general advancement of the knowledge and practice of Acoustics, which shall be deemed to include all aspects of the science and technology of sound, noise, hearing and vibration;
- * To maintain the integrity and status of the profession; and
- * To represent it both to the public and to the Government.

Our International Affiliation

One of our objectives is to promote the general advancement of the knowledge and practice of Acoustics. To enable us to update and upkeep ourselves with the latest development in these aspects, we also present ourselves to the academics, professionals and practitioners through participations as member Societies of:

- * The International Commission for Acoustics (ICA) - which was instituted in 1951 as a subcommittee to the International Union of Pure and Applied Physics and through IUPAP to the International Council of Scientific Unions (ICSU), and hence to engineering bodies. The purpose of the ICA is to promote international development and collaboration in all fields of acoustics including research, development, education, and standardization.
- * International Institute of Noise Control Engineering (I-INCE) - The I-INCE was founded in 1974. It is a worldwide consortium of organizations concerned with noise control, acoustics and vibration. The primary focus of the Institute is on unwanted sounds and on vibrations producing such sounds when transduced. Amongst others, I-INCE in 1992 instituted a program to undertake technical initiatives on critically-important issues of international concern within the I-INCE field of interest. This initiative has resulted in three reports and five ongoing Technical Study Groups. HKIOA has a representative as a member of Technical Study Group #6 - Community Noise: Environmental Noise Impact Assessment and Mitigation.
- * International Institute of Acoustics and Vibration (IIAV) - The IIAV is to advance the science of acoustics and vibration by creating an international scientific society that is responsive to the needs of scientists and engineers in all countries whose primary interests are in the fields of acoustics and vibration. The Institute cooperates with various international organizations by sponsoring seminars, congresses and publishing journals and newsletters. We became a member society since 1999. We were one of the supporting organizations in hosting the Eighth International Congress of Sound and Vibration in Hong Kong in 2001 which attracted over 400 delegates.
- * Western Pacific Acoustic Conference (WESPAC) - WESPAC is an international conference that promotes the advancement of acoustics, noise control technologies and their applications. The Conference will have sessions on transportation noise, environmental noise, industrial noise and construction noise, which have become major environmental problems in Hong Kong, China and other Asian countries. WESTPRAC was first held in Singapore in 1982 and every three years thereafter in various countries/cities. The WESTPRAC II (1985) and VI (1997) were held in Hong Kong. Both events attracted over 150 delegates from Asian countries, Europe and USA.



8th ICSV in 2001



WESTPRAC VI in 1997



Message from the Chairman

Dr K M LI

Chairman (2002 - 2004)

The celebration of an anniversary gives an organisation a unique opportunity - a moment in time to reflect upon the successes of the past, to examine disappointments and to look to the future, to plan where the organisation will be in the next ten, twenty years and even the next millennium. It is a time for celebration and also a time for reflection.

The fact that HKIOA has existed for 10 years stands as a testimony to the many great leaders who have gone before us, carrying the ideas and ideals of professionalism among the rank of Acoustics, Noise and Vibration (ANV) practitioners. To those who founded the HKIOA on 7 December, 1993, and to all past Chairmen since, I would like to extend my sincere thanks for their dedications and commitments to shaping the future of HKIOA. They were leaders, pioneers who had the vision and wisdom required to establish the Institute never before taken. Convincing an industry of individualists to join a new institute was, undoubtedly, a challenging task.

The Hong Kong Institute of Acoustics is people - you and me and over 200 other ANV practitioners who care deeply about our industry, who want to see our industry survive in a fair and competitive marketplace. The Institute is where entrepreneur individuals who come together at meetings and conventions to share ideas, and stories of failures and successes. It's people who want to elevate the professionalism of this industry. It's people who value honesty, integrity and HKIOA's professional code of ethics.

Looking beyond today, it is my sincere desire to have the same vision HKIOA's founders had in 1993. HKIOA needs more members to step forward and take on the responsibilities of leadership in the various fields of Acoustics, Noise and Vibration. In our 10th Anniversary year, I see golden opportunities for leadership, golden opportunities for influencing positive changes, and golden opportunities for carrying on the dreams of our founders. I encourage the HKIOA's members to dis-

cover the rewarding HKIOA leadership opportunities that are available. One thing I have learned is that a profound way to look at anything is to look at where it has been, where it is and where it is going. We know where HKIOA has been and where it is. Now it's our time and your opportunities to determine where it's going.

As detailed in our official website (<http://www.hkioa.org>), the main events representing this celebration are going to take place throughout this year and the next. Such events include Grand Dinner, Fun Night at Happy Valley, Symposium 2003 and many other events.

Looking forward, I am excited by the possibilities that abound to further develop cohesive relationship among members, who come from the academia like myself, Government officials, consultant specialists and contractors in the commercial sectors. The next decade promises to bring a re-invigoration of our relationship, cementing and building on the work of the past decade.

Message from the Editor

Y NAU YEUNG

Chairman, Publication Sub-Committee

The chief of the HKSAR Mr Tung Chi Wah always emphasizes the importance of communications between the Government and the public in order to get things done. Members of the Hong Kong Institute of Acoustics luckily have an effective way to communicate long before that, i.e. through the SOUNDING BOARD.

The sounding board is more than ten years old now and it witnesses the growth of the Institute from IOAUK- HK Branch to HKIOA and the development of the acoustic industry in Hong Kong. When I picked up the editorial duty of the Sounding Board, I found it challenging. Since the previous editions were very informative, what I need to do is to have the following ones value added.

The major change is the content. Apart from reporting the activities of HKIOA and the analysis of the latest hot issues of

the acoustic industry, we have personal interviews of the celebrities in this field under the "Elite Club". It is valuable for us to share the experience of professionals in order to enhance the quality of the industry. We also have the "Members' Talk" corner that serves as the bridge to link up members who can freely express their views and experience through contributions to the newsletter. Starting from this year, the Sounding Board has been transformed from the long tradition of hard copy to electronic format with corresponding uploading to the Institute website in a move to make full use of the advancement in IT, to save editing/printing/ mailing costs and to echo with the call for environmental protection.

This commemorative edition of Sounding Board is prepared to celebrate

the 10th anniversary of the Institute. It gives us a chance to refresh our memories about the history and development through the write-ups by our past and present chairmen and committee members. We also have the honour to receive contributions from our "grand father" Prof Norman Ko and renowned senior members Mr. Raymond Chan and Dr. Alex Chan. Our very supportive member Mr W P Ko also shares with us his experience through the "Members' Talk" corner.

Ten years passed by but we have many ten years ahead. We'll keep on updating and upgrading information to our members. We need your full support and please contribute your articles or give us advice. Thanks a lot!



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OUR OLD DAYS



*"Meyer Poor Memorial Award"
Presentation Ceremony in 1995*



*Visit of Environmental Protection
Bureau of Tokyo Metropolitan
Government in 1996*

WESTPRAC VI in 1997



*Visit of National University of
Singapore in 1998*



*The Acoustical Society
of America visited
HKIOA in 1999*



Managing Rail Noise Symposium in 2000



*Visit of Guangzhou &
Shenzhen in 2001*



Visit of Macau in 2002