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MASA:

Saya mengucapkan berbanyak terima kasih kepada pihak penganjur kerana menjemput saya dan isteri saya ke Majlis Jamuan Makan Malam Tahunan Lembaga Jurutera Malaysia ini. Saya berasa gembira diberi peluang berjumpa dengan tuan-tuan dan puan-puan.

2. With the current emphasis on industrialisation in pursuit of Malaysia's Vision 2020, the demand for engineers and technologists in the near future will definitely increase. By the year 2000, some 56,600 engineers are needed compared to 26,500 in 1990. This means a rise of 9.8 per cent per annum. It is crucial that we get the right kind of engineers to meet the needs of our industry. Universities and other institutions must provide continuing education and re-training to fulfill this purpose. They must modernise science and engineering education consistent with changing times. It may be necessary to reverse the sequence of teaching so that practical hands-on work comes before the theories and principles of engineering. Most students learn faster if they are physically well acquainted with their subject.

3. The role of engineers has to be seen in the broad spectrum of supplying vital technological input in the business of wealth generation. Instead of seeing engineering as an exact science divorced from the realities of commerce, engineers need to appreciate that engineering without application is unproductive.

4. The role of engineers appears to be turning a full circle - starting off as creative individuals working to resolve the problems of living, and then moving towards a traditional role as "backroom boys". Engineers are now required to be more innovative and conversant with all aspects of business. In a scientific and technological culture, where emphasis is on Research and Development, engineers must lead from behind. Still an engineering background can often lead to a more perceptive management capability in the engineering based industries.

5. In this regard one may ask whether engineers are ready for these roles. Vision 2020 has outlined the agenda for leading Malaysia towards a developed nation status. Guided

by this vision, engineers clearly have an important role to play. Engineers must recognise the fact that the application of technology cannot be left entirely to non-engineers. Therefore, engineers have to equip themselves to play an active role in policy determination and decision-making. Their own institutions and associations have to look into how best to equip practising engineers. Engineers have to assume their place as both generalists and specialists knowledgeable about the multi-disciplinary environments of today. Only if engineers have achieved sufficient experience all-round can they prove useful in the processes of commercialising engineering based enterprises.

6. Like other professionals, engineers too would have to maintain a good image and accountability. This is extremely important. Technical aspects of any project have direct bearing on costs. Yet it does not lend itself to critical assessment by non-engineers. It would therefore be easy for specifications to be tailored for a definite objective. Engineers must avoid this temptation if they wish to keep their reputation and that of their profession in high esteem. In the long run the profession and the engineers will gain more by sticking to professional ethics and integrity.

7. In this new Information Age, to remain competitive, one must make the quantum leap into strategic technologies, such as micro-electronics. Investments in electronics are already highly visible in Malaysia. However, exciting opportunities are created by new innovations in areas like electronics-based communications which can lead to shorter product life cycles by using concepts such as "concurrent engineering". The future growth and survival of companies will hinge upon the ability of engineers to use these applications in the right places, and in continuous innovation through collaborative research.

8. In this regard, Malaysian engineers have to strive to adapt these new technologies to suit local conditions. They must take the initiative by taking stock of our rich local resources, the exposures to new technics and technologies and their own involvement in these activities.

9. It is not worthwhile to bemoan the unwillingness of foreigners to transfer technology to us. It must be remembered that we ourselves are not keen to pass on our technology to others, especially our competitors. Technology transfer can only take place if our engineers are diligent and sharp observers who are constantly reading up on the latest technology. They must be prepared to use their knowledge and experience to upgrade their applied skills all the time. Technology transfer can only take place if we show keenness to receive the transfer. No one will hold our hand and guide us every inch of the way.

10. In order to remain competitive, Research and Development must be given its rightful place. R & D is not an academic exercise. It is an applied science and it must be

relevant to the objective of the organisation. Far too often in Malaysia the results of R&D are neglected, as we are not keen to try anything new. Yet if someone tries and is successful, everyone will rush in - ignoring other results of R&D which have not yet been tried. The result is concentrated competition in one field and neglect in many others. R&D is only worthwhile if we have the right attitude towards its results. It is well-known that although most of the original research is done in the West, it is the Japanese who benefit from the application of the results.

11. Traditionally, Malaysian engineers had supporting roles in the development of infrastructural projects. However over the years they have progressed towards a bigger role especially in civil engineering, and in the oil and gas industries. Nevertheless, with the rapid growth of the oil and gas sectors, engineering expertise in process industry is not being attained quickly enough. This is another area where we ought to seriously focus our engineering attention.

12. So much have been said about environment and development. For a long time, we have recognised that man in his pursuit for development has polluted and degraded the environment. Enough damage has been done by the industrialised North for centuries in pursuit of their well-being. Since we in the developing countries cannot stop development altogether, our engineers must learn from the mistakes of the North and try to minimise damage to the environment.

13. Malaysia has for several years been cutting back on the emission of carbon dioxide. However, what we are doing is not enough. Improper maintenance of the engines of heavy vehicles in particular is causing unnecessary emission of black smoke every time the vehicles accelerate or climb hills. While the Government can take legal action, it is far better if the vehicles are properly serviced in order to reduce emission. Engineers in the motor industry should study the causes of smoky engine and find solutions to the problems. We should try to innovate in this field and not just wait to buy anti-pollution devices from the North. We should not allow only the North to profit from the worldwide concern over the environment.

14. Malaysia is fortunate to be blessed with abundant natural resources, good administration and responsible citizens who value political stability and racial harmony. We have achieved considerable progress - a unique achievement considering the complexity of our society and its inequities. We can do more if everyone understands that what is good for society and the nation is also good for the individual. It is far better to seek common good than short-term personal gains at the expense of society. Engineers constitute an important cog in the wheels of progress. The greater the integrity of the engineers, the smoother will the wheels of progress turn. But by itself the cog will move nothing. Malaysia needs its engineers in order to progress as much as the engineers need the Malaysian soci-

ety. So all must put their shoulders to the wheel for all of us will benefit. In the last few years, we have demonstrated this efficacy or combined efforts at development.

15. Sekali lagi saya mengucapkan terima kasih kerana menjemput saya ke majlis malam ini. Dengan ini saya akhiri dengan harapan para jurutera di negara ini akan terus memberi sumbangan yang besar kepada pembangunan dan kemajuan negara.