

**SPEECH BY MR KHAW BOON WAN, COORDINATING MINISTER
FOR INFRASTRUCTURE AND MINISTER FOR TRANSPORT,
AT THE LAUNCH OF THE SINGAPORE RAIL ACADEMY,
23 FEB 2017, 9.45AM AT SINGAPORE INSTITUTE OF TECHNOLOGY**

Professor Cham Tao Soon, Chairman of the Singapore Rail Academy Board (SGRA),

Professor Tan Thiam Soon, President of the Singapore Institute of Technology (SIT),

Ladies and gentlemen,

The Early Days

1. A vanguard of engineers pioneered our first MRT line. In 1982, when the Government decided to build an MRT system, there was very little local expertise or experience. A team had to be set up from scratch. Led by the late Mr Lim Leong Geok¹ and Mr Low Tien Sio², the team was small, comprising fewer than 50 local engineers. Their job was to learn from the foreign consultants, build up a core of Singaporean expertise, and train the next generation of rail engineers.

2. Several members of the pioneer team had left promising careers as they were enticed by the challenge of building an MRT network. One of the first challenges was how to design the underground tunnels for the MRT in the city area. The original design of the tunnels, like typical underground rail systems, had the east-bound and west-bound tunnels running parallel to each other. But this was unfeasible for some areas, such as the City Hall district, because there were complicated building foundations underground. Some of the historic

¹ Mr Lim Leong Geok was part of the very initial team that researched and then persuaded the Government to build the MRT network. Before 1983, he was Deputy Director at the Public Works Department, Executive Director of Singapore Bus Services Limited and Chief Planner at the Planning Department of the Ministry of National Development. From 1983 to 1994, he headed MRT Corporation and SMRT as its first Executive Director. In 1987, he was concurrently appointed as Managing Director of SMRT. From 1996 to 1999, he was Deputy Chairman of SMRT. Mr Lim was a civil engineer by training.

² Mr Low Tien Sio is currently Deputy CEO of Sentosa Development Corporation. He is also a member of the Development Projects Advisory Panel set up by the Ministry of Finance and the Valuation Review Board. He was Executive Director of MRT Corporation from 1994 to 1995 before he became Director of Planning and Projects in LTA from 1995 to 1998, and then Deputy Chief Executive from 1998 to 2007. During his stint in MRT Corporation and then LTA, he was responsible for initiating the Woodlands and Changi Extensions to the MRT system, the North East Line as well as the Light Rail Transit Systems. He also guided much of the planning effort for the Circle Line, the Downtown Line, the Thomson-East Coast Line, and the Kallang-Paya Lebar Expressway. Mr Low was an engineer by training and obtained his Bachelor degree in Quantity Surveying.

buildings there, such as the old Convent of the Holy Infant Jesus, now known as CHIJMES, could be affected if we placed the tunnels side-by-side.

3. To overcome this, the team redesigned the tunnels to stack up, one on top the other. This allowed the tunnels to pass between the buildings' foundations safely. Today, we still use the method for our new MRT tunnels.

4. Another unique engineering challenge was Singapore's high groundwater table. This hindered underground construction. To overcome this, the team performed what was then the largest compressed air operation in Singapore using the open tunnelling method. This operation used the pressure of the compressed air to keep the groundwater out. Today, we are all beneficiaries of the ingenuity and indomitable spirit of our pioneer rail engineers.

Growing our Engineering Pool

5. We are now at a second phase of our rail journey. Our rail network will be 360km long by 2030, which will bring us to a rail density similar to London and New York today. However, London and New York built their current rail networks over the span of a century, while we are building ours in less than half the time. At the same time, we are working hard to improve the reliability of our rail system, to be among the best in the world.

6. Because of these two objectives of rail expansion and rail reliability, we have to rapidly grow our pool of rail engineers and technicians. We have been relentless in our hiring. Over the past five years, LTA and our two rail operators have increased their hiring for engineering, operations and maintenance by 50%, bringing the total industry headcount to about 9,300. By 2030, we expect this number to further increase to 15,000. This makes the rail industry a growth industry, whose employment prospects are almost guaranteed in the next decade. Salaries are also attractive. While the median pay for fresh graduates in 2015 was about \$3,300, engineers joining the public service for instance, can expect about \$3,800 a month. I believe that our rail operators are also paying higher than the median pay for engineering graduates.

Developing an Advanced Rail Engineering Corps

7. A rail engineer or technician's job today is very different from that in the 1980s. It has become more complex and requires significant inter-agency coordination, because we need to build our rail systems deeper underground. New challenges will also emerge now and then. For example, in building Downtown Line 3, we did not just have to deal with a high groundwater table as in the past,

but we had to divert a part of the Singapore River! It was an amazing engineering feat.

8. In the next decade, the rail engineer's job will evolve even more. For example, we are moving from preventive to predictive maintenance. This is because the technology to monitor the condition of our train systems on a real-time basis has become more prevalent and affordable. There will also be opportunities for our rail engineers to be involved in complex, cutting-edge projects, like the Singapore-Kuala Lumpur High Speed Rail (HSR). I hope that the HSR can inspire a new generation of rail engineers, as the MRT system did thirty years ago.

9. To develop this new generation of rail engineers, we will follow three strategies.

10. First, we need a platform for engineers and technicians to join the rail industry, regardless whether they are fresh graduates from our universities, polytechnics and ITEs, or from other fields, or if they are non-practising rail engineers who wish to come back into the field.

11. Second, we need to provide continuous training and accreditation for existing rail engineers and technicians. The accreditation will facilitate their mobility across the industry and enhance their market value.

12. Third, we need to spur research and innovation by public and private entities in the industry. This will be crucial, for instance, for us to reach and surpass 400,000 train-km in MKBF in the most resource-efficient way possible. Our expanding rail network presents us with an invaluable opportunity to study, develop, and implement state-of-the-art systems for maintenance and operations.

The Singapore Rail Academy

13. The Singapore Rail Academy will be instrumental in all three strategies.

14. The Academy will be a centre for skilling, up-skilling and re-skilling, and a centre for accreditation and certification of proficiencies. This is so that aspiring engineers and technicians can easily join the rail industry and ensure that their skill level is consistent with industry needs.

15. The Academy will also be a research and development centre for rail engineering. It will conduct applied research with Research Institutes and Institutes of Higher Learning. We already have a head start. Today, we are one

of the leaders in driverless trains. The Downtown Line, when complete, will be the world's longest underground driverless system. In fact, after the North East Line began driverless operations in 2003, other cities approached us to help them develop similar systems. We should build on this foundation, and become leaders not only in driverless train operations, but also in predictive rail maintenance.

Closing

16. I would like to express my gratitude to Professor Cham Tao Soon for agreeing to take on the challenge of leading the Singapore Rail Academy. Professor Cham is a luminary who has contributed immensely to our education and engineering professions. In 1969, Professor Cham built up the first engineering faculty at the then-University of Singapore. And he later set up the Nanyang Technological Institute (NTI) – now Nanyang Technological University (NTU). He is also familiar with transport, as he was a director of SMRT from 1987 to 1999, and a member of the LTA Board from 1999 to 2008. Professor Cham's close association with the land transport and education industries gives me great confidence that he will lead the Academy to become a premier railway institution.

17. The Singapore Rail Academy is our investment in future generations of rail engineers. They are the backbone of our rail system, and make it possible for millions of commuters to get to their destinations efficiently and comfortably every day.

18. I wish Professor Cham and his team at the Singapore Rail Academy every success. Thank you.