

Great walls of Nehemiah

DID YOU KNOW?

The modern theory of reinforced soil technology was introduced by French architect Henri Vidal in the 1960s, although the basic concept has been used for centuries in Asia and Europe. A crude form of reinforced soil technology was used to build parts of the Great Wall of China. The section that runs through the Dunhuang region was built combining layers of clay and gravel reinforced with reeds and tamarisk branches. Some of the resulting wall sections are still standing today.

doctorjob talked to Ir Dr Nehemiah Lee, a pioneering Malaysian geotechnical engineer whose inventions help in the infrastructural development of the country.

16

COURSES NOW! ENGINEERING

Most of us have probably never given a second thought to the walls we see every day along highways and in housing estates – or even less, what goes in them. For Ir Dr Nehemiah CH Lee, however, building these walls is his business.

Dr Lee is Managing Director of Nehemiah Reinforced Soil Sdn Bhd, which specialises in the construction of retaining walls used in housing development projects, highways and even the overhead bridges that are currently being built along double-track railways from Ipoh to Padang Besar. He is the inventor and

patent holder of the Nehemiah Wall system, a proprietary application of reinforced soil technology used to construct retaining walls.

Laying the foundations

It was for eminently practical reasons that Dr Lee chose to study engineering in university.

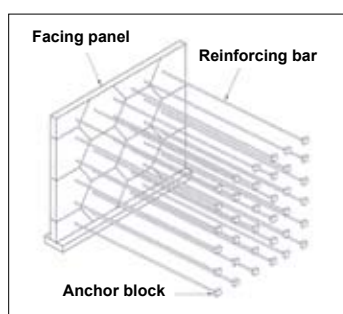
‘In those days engineering was called “the Iron Rice Bowl”, in the sense that you would get a job and earn a decent living,’ he recalled.

An alumnus of Kluang Secondary English School (now Kluang High School), Dr Lee found himself drawn to the science stream after Form 3

and subsequently studied double maths, physics and economics in Form 6 for his Higher School Certificate (HSC) examination (equivalent to the STPM), obtaining 4 As. He was then offered the opportunity to study science or engineering in university. Although he was fascinated by nuclear physics at the time, Dr Lee opted to pursue engineering, eventually gravitating towards a specialisation in geotechnical engineering.

‘Compared with structural (engineering), in geotechnical engineering there are more unknowns,’ explained Dr Lee.

Using reinforced soil technology to build retaining walls



Schematic representation of Nehemiah wall system.



The first step is to remove unsuitable subsoil material and replace it with well-compacted granular material. A concrete levelling pad is installed at the formation level.



The first course of facing panels are placed on the levelling pad. The hexagonal facing panels are made of precast concrete and interlocked with dowel bars.

Left: This is the highest retaining wall erected in Malaysia (at 20.5m), built in 2001 by Nehemiah Reinforced Soil. It is located at the Pos Selim-Simpang Pulau-Kg Raja stretch of the 2nd East West-Highway, Cameron Highlands.

‘In structural engineering, the theories are quite well established, but in geotechnical there are still a lot of unknowns to discover, to find out, to learn, to research.’

Dr Lee was first introduced to reinforced soil technology while pursuing his Master’s degree in civil engineering at the University of Notre Dame.

‘I found it fascinating,’ he said. ‘When I came back, I continued to have an interest in this field and so I joined a company that specialised in reinforced soil.’

In 1993, after spending some time in senior management positions in several engineering firms, including multinationals, Dr Lee eventually struck out on his own.

Founded on integrity

Starting his own company was also Dr Lee’s way of making a stand against what he perceived to be rampant corruption within the construction industry.

‘That is the reason why I started the company: so I can conduct business with integrity and don’t have to get involved with bribery. It was only possible to do so if I was in charge.’

‘Of course, it was challenging because the pressure to comply with the norms of the marketplace was enormous,’ Dr Lee admitted. ‘When I started, people were saying that if you didn’t practise bribery, you wouldn’t survive. I thought that maybe I could make a living by doing small jobs, for bungalows and so on, that don’t usually need to bow to corruption. If I could just

earn a decent income, and provide education for my children, I would be happy, but it has gone way beyond what I envisioned I could accomplish.’

The company has stayed in the black for 15 of the 16 years it has been in existence – making a loss only in its first year.

Building on success

Dr Lee’s hard work and commitment to integrity has indeed paid off handsomely. Nehemiah Walls, with their distinctive hexagonal concrete panels, can be seen all over Malaysia, where Nehemiah Reinforced Soil is the current market leader in its field. The company was awarded MS ISO9001:2000 certification in 2001.

The home-grown technology has also been exported to a number of countries – among them Singapore, India, Sri Lanka and Bangladesh – with plans to enter the Australian, Hong Kong and Vietnam markets in the near future.

With everything that he has accomplished, what does Dr Lee consider to be his most significant achievement?

‘Of course to travel around the country and see the projects successful, as a result of hard work put in, that is very satisfying,’ he replied. However, ‘Having a company that can stand up to corruption; have integrity; contribute towards nation-building and national infrastructure; and to provide employment for the staff and a happy environment for them to work and learn – that is the most satisfying,’ he said. 🙏

WORD OF ADVICE

‘You cannot do everything by yourself; you have to lead a team and it’s important to develop organisational skills and interpersonal relationship skills. Those who master these skills can go far in their career.’



Ir Dr Nehemiah CH Lee graduated from the University of Malaya with a BE (Hons) in 1977. He obtained an

MSc in Civil Engineering from the University of Notre Dame, USA, in 1979, and a PhD in geotechnical engineering from the University of Malaya in 2006. He is a member of the Institution of Engineers, Malaysia (IEM). Dr Lee is registered with the Board of Engineers Malaysia as a professional engineer.

Dr Lee began working for the government in the Drainage and Irrigation Department in 1977. He was then recruited by Reinforced Earth (SEA) Pte Ltd where he was an early pioneer in the use of reinforced soil techniques in Malaysia. He has also previously held the positions of General Manager at Hume Industries (M) Bhd and Polyfelt Geosynthetics Sdn Bhd. He is the founder and Managing Director of Nehemiah Reinforced Soil Sdn Bhd.

Dr Lee often speaks at local and international conferences, and is an industrial adviser to Universiti Tunku Abdul Rahman (UTAR).

All photos courtesy of Ir Dr Nehemiah Lee



3

More granular material is then backfilled, spread, levelled and compacted.



4

Reinforcing tendons made of carbon steel rods are connected to the facing panels and the precast concrete anchor blocks.



5

This process of installing panels, backfill, tendons and anchor blocks is repeated until the desired height of the wall is reached.