Inspiring Stories of
Indian Women in Engineering

ROOTS AND WINGS

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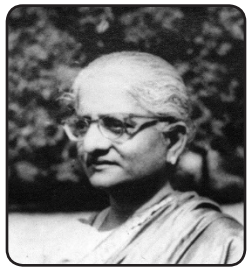


In the 1940s, Lalitha Rao didn't know she was making history when she started her education in the technical field. But she did—as the first woman engineer of India, and the first woman to graduate from the oldest Indian technical institution, the College of Engineering, Guindy (CEG), University of Madras.

Early Life

Lalitha was born on 27 August 1919, in Chennai (then Madras). She had a middle-class upbringing in a Telugu-speaking family (Chennai is predominantly a Tamil-speaking city). She had four older and three younger siblings. Child marriages were the norm in India in the first quarter of the 1900s, and Lalitha was married in 1934 when she was 15. Her studies continued even after marriage but came to a stop after she received the Secondary School Leaving Certificate (SSLC or Class X). Her daughter Syamala was born in 1937 and was only four months old when Lalitha's husband passed away.

As a young widow with a baby, all Lalitha wanted to do was to go back to college and get a professional degree that would enable her to be self-sufficient.

India was not a friendly place for widows in those days and continues to be so even today. This must have been on Lalitha's mind later when she represented India in the Women Engineers' Society's first conference in 1964, where she is known to have said: 'A hundred and fifty years ago, I would have been burned at the funeral pyre with my husband's body.' 1939 wasn't quite as bad, and with the support of her family, Lalitha could think about making a life for herself and her daughter.

Professional Education

Lalitha joined Queen Mary's College in Chennai and completed her intermediate exam with a first class.

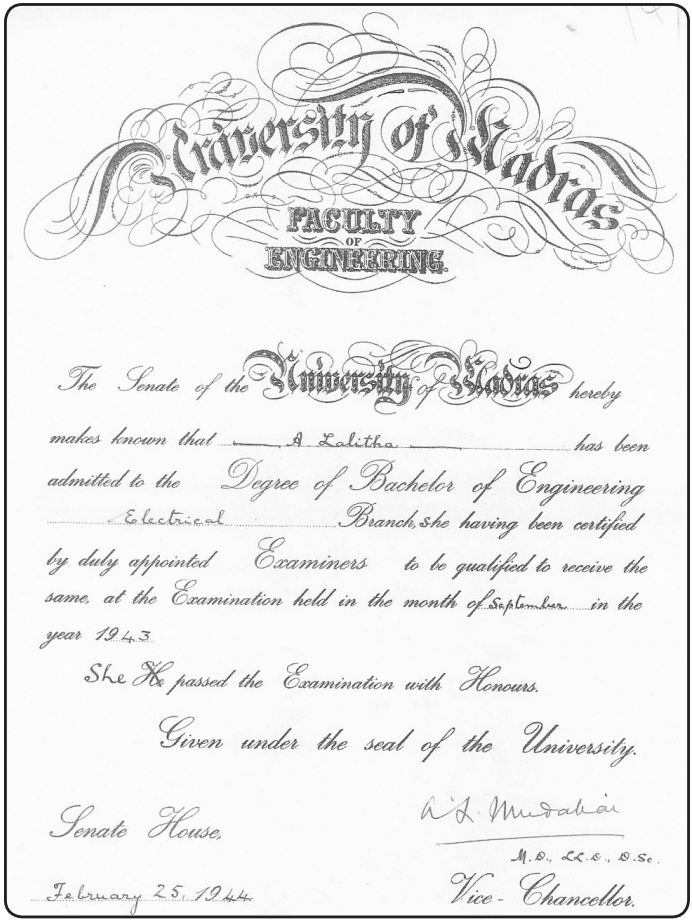
Women were already making a name for themselves in the field of medicine. As early as the late 1800s, there were a handful of women who graduated with western medical degrees. Lalitha thought about medicine as a career, but the rigours of being a doctor while taking care of a young child didn't appeal to her. The other option was to become an engineer and follow in the footsteps of her father and brothers. Lalitha was a brilliant student and getting into CEG today would have been a breeze. However, this seemed impossible in an age where technical education was considered a male prerogative. Luckily, her father, Pappu Subba Rao, was a professor of electrical engineering at CEG. He took up his daughter's cause and spoke to the then principal of the college, Dr. K.C. Chacko. It appears he also had to get an approval from the British government official Sir R.M. Statham, Director for Public Instruction.

The first women graduates of CEG: P.K. Thressia, Leelamma George, and A. Lalitha

Image courtesy of Syamala Chenulu

Lalitha entered CEG as a student of the four-year electrical engineering programme. Campus life as a lone woman must have been challenging. Thinking back to my days

on the campus in the 1960s, which was much more progressive, I can see how she might have felt about having to study by herself. None of the camaraderie that the male students would have had in studying together, working on projects, and having lunch together would have been possible. However, being the daughter of a professor would have compensated in some ways. The addition of two more women to CEG in 1940 was quite welcome. Both Leelamma George and P.K. Thressia joined CEG to study civil engineering in 1940. All three of them would complete the programme in 1943, becoming the first batch of women to do so from CEG. Lalitha's honours degree in electrical engineering was awarded in February of 1944.



University of Madras

FACULTY OF ENGINEERING

The Senate of the University of Madras hereby makes known that A Lalitha has been admitted to the Degree of Bachelor of Engineering Electrical Branch, she having been certified by duly appointed Examiners to be qualified to receive the same, at the Examination held in the month of September in the year 1943.

She ~~He~~ passed the Examination with Honours.

Given under the seal of the University.

Senate House,

February 25, 1944

M.D., LL.D., D.Sc.
Vice-Chancellor.

Lalitha's degree certificate illustrates the state of women's technical education in the 1940s. The "He" in the certificate had to be stricken by hand, to be replaced by "She."

Image courtesy of Syamala Chenulu

Working Life

Lalitha completed her qualifying examinations for the Bachelor of Engineering degree in electrical engineering in 1943. The final requirement for the degree was practical training. Lalitha completed her one-year apprenticeship in the Jamalpur Railway Workshop, which was a major repair and overhaul facility in India at the time.

In 1944, Lalitha joined the Central Standards Organization of India (CSOI), Simla, as an engineering assistant. As a widow with a six-year-old daughter, she chose this job since she could live with her brother's family and get help from her sister-in-law in raising her daughter. She stayed on the job until December 1946. She also took the graduateship exam of the Institution of Electrical Engineers (IEE), London, UK.

At the instigation of her father, Lalitha left her job to help him with his research. Lalitha's father had several patents including Jelectromonium (an electrical musical instrument), smokeless ovens, and electric flame producer. She couldn't continue this after 1948 for financial reasons and joined the Associated Electrical Industries (AEI). The post was to be in Calcutta, and Lalitha's second brother lived there, which was fortunate since living by herself would have been problematic as a widow in those days. In AEI, Lalitha worked in the engineering department, and sales division, Calcutta branch.

She had a very satisfying job there as a design engineer designing transmission lines. Her work also spanned solving problems related to protective gear, substation layouts, and execution of contracts. A notable project was the work on electrical generators for the Bhakra Nangal dam, the largest in India. Lalitha's son-in-law, also an electrical engineer, knew of her work intimately and had this to say: 'Gradually, the designing part was discarded, and the activity focused on contract engineering, serving as an intermediary between the equipment manufacturers in England and the local installation and servicing engineers. She continued to work in the same office of AEI, which in later years was taken over by the General Electric Company (GEC), and retired after over 30-odd years.'

As a contracts engineer, AEI engineers were frequently required to visit the installation sites and the offices of the organizations that bought the imported equipment. Being a widow with a child, Lalitha's work was confined to providing the expertise and assistance to those who were senior to her and she did this with great efficiency and satisfaction.

In 1953, the Council of the Institution of Electrical Engineers (CIEE), London elected her to be an associate member and in 1966 she became a full member.

One of the highlights of Lalitha's career was being invited to the First International Conference of Women Engineers and Scientists (WES) in New York that took place in June 1964. At that time, there was no Indian chapter of the organization and Lalitha took it upon herself to attend the conference in a private capacity, overcoming many hurdles to do so.

From Wayne State University's Walter P. Reuther Library, which houses the WES archive:

> *'The Society of Women Engineers (SWE) held the first International Conference of Women Engineers and Scientists (ICWES) June 15-21, 1964, to coincide with the SWE National Convention and the 1964 World's Fair in New York City, New York. Although ICWES planners originally estimated 300 participants, the conference brought together over 500 people from more than 35 countries to discuss the role of women engineers and the future of engineering.'*

Attendees gather at the 1964 New York World's Fair during the First International Conference of Women Engineers and Scientists, hosted by the Society of Women Engineers in June 1964. Left to right: A. Lalitha (Indian delegate), Joan Shubert, unknown Canadian delegate, N. Sainani (Canadian delegate of Indian origin), and Dee Halladay.

The goal of the conference was to increase the participation of women in science, technology, engineering and math (STEM) and the women in the conference shared their experiences.

Lalitha noted:

> *'The conference resolved to encourage women to increase their participation in the professional societies in their countries and improve their qualifications not only during their student days but throughout their professional life. It also resolved to maintain the central file of Women Engineers and Scientists used for this conference and enlarge it as much as possible.'*

The Indian national and regional newspapers, such as the *Times of India*, *Indian Electrical News*, *Dharmayug*, *Hitavada* and *Poona Daily News* covered her trip to the conference.

On her way back to India, Lalitha spent three weeks touring the UK, visiting AEI factories including Trafford Park (Manchester) and the Rugby works.

Upon her return, several popular women's magazines in India such as *Femina* and *Eve's Weekly* interviewed Lalitha. In these interviews, she voiced her belief that women should be equal participants in the field of engineering.

Lalitha became a full member of the Women's Engineering Society (WES) of London in 1965 and agreed to act as their representative in India for the Second International Conference of Women Engineers and Scientists, held in Cambridge, England, in July 1967. She marketed the event in India, and five women engineers from India were able to attend the event.

Engineer, Mother, an Inspiration to All Women

Lalitha's accomplishments, when she achieved them, are awe-inspiring. They would not have been possible without the extensive support structure she had. Her parents encouraged her. Her father went to bat for her in getting her admission to CEG. Her sister-in-law brought up Lalitha's daughter along with her own son so that Lalitha could focus on her studies. Lalitha lived for more than 35 years with her sister-in-law in the same house in Calcutta, all part of an extended family, looking after each other's interests.

Lalitha and her niece

Image courtesy of Syamala Chenulu

Syamala says she never felt the absence of her father because of the strong support she received from her mother. Lalitha encouraged her to study science and participate in extracurricular activities, such as tennis and swimming. Syamala, who is married to a scientist, has degrees in science and education. Her children are scientists as well. It is amazing that at the age of 79, she is still teaching mathematics at a school in the USA.

Syamala on a trip to Egypt

Image courtesy of Syamala Chenulu

Lalitha supported the view that widows should remarry, though she herself remained unmarried since she felt committed to her daughter.

She retired from work in 1977. Post-retirement found her traveling in Southern India with her sister. In 1979, when she was only 60 years old, she was struck with a brain aneurysm and passed away after a couple of weeks on 12 October.

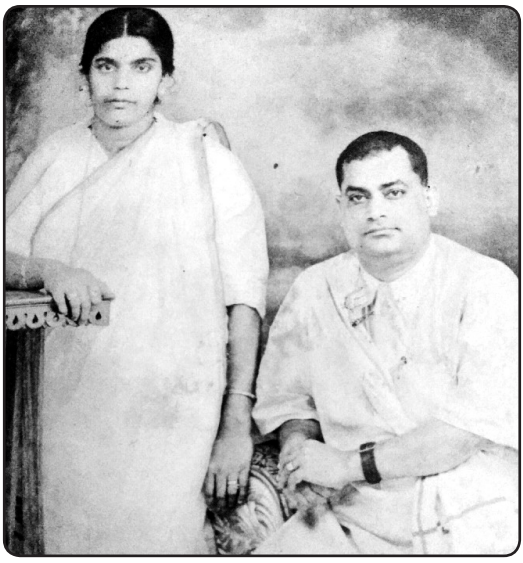
Lalitha once said 'Electrical engineering runs in my blood. My father, four brothers, nephew and son-in-law are all electrical engineers.' Today, many girls get a STEM education—both in India, and elsewhere. For any number of reasons, many of them decide to drop out of their fields. It takes grit and interest in the field to stay the course and Lalitha's life is a beacon of light for all the women who came after her in the 1950s, but also today.

P.K. Thressia: India's First Woman Chief Engineer

P.K. Thressia was one of the three women in the first batch of women students to graduate from the College of Engineering, Guindy (CEG), Chennai, India, in 1943. She would go on to become the first lady chief engineer in Kerala's Public Works Department (PWD). She was an outstanding student at CEG, and she carried on this excellence to her engineering career that started in 1944 and culminated in her becoming a chief engineer in the state of Kerala in 1971. During her time in office she was known for her ability to lead projects delivered on time with good quality and for the honesty and integrity she brought to everything she did.

Early Life

P.K. Thressia was born on 12 March 1924, one of six surviving children to Kakkappan Paniculam and Kunchalichy. She was the second child in the family. She had one older sister, Mary, and four younger siblings – Baby, Lily, Rosy and Jose. She had several younger siblings who did not survive. Thressia's father was an agriculturist from Edathiruthy, Trichur District, which at the time was in Madras Presidency. They belonged to the Syrian Catholic faith and were devout Christians.



Thressia's Parents: Kakkappan Paniculam and Kunchalichy

Image courtesy of Ojus Job

Thressia was an excellent student. She graduated from St. Mary's High School in Kattoor, where her father Kakkappan was the manager. He was interested in seeing Thressia achieve her full potential and wanted to see her get an engineering degree. The only engineering college in Kerala at the time did not admit women, so Thressia applied for admission into CEG, and started her civil engineering education there.

At CEG

Thressia was one of the three women students in her batch. The other two were A. Lalitha and Leelamma (George) Koshie. Thressia continued to shine in academics at CEG. Her engineering education was compressed into three and a half years because of the Second World War. She and her classmate Leelamma had to stay off-campus and commute to the CEG every day to attend classes. Not much else is known about her years at CEG.

History Making Career: First Woman Chief Engineer in Asia

Upon her graduation from CEG, Thressia joined the Public Works Commission of the Kingdom of Cochin under British rule as a section officer. Soon she was promoted to assistant construction engineer for the TB Sanatorium, Mulakunnathukavu. In 1956, her accomplishments led to her becoming executive engineer, and she was relocated to Ernakulam. She served in this capacity for nine years. In 1966, she was promoted to superintending engineer of Kozhikode Roads and Buildings.

In 1971, she was promoted to chief engineer of the state of Kerala. According to Kerala's premier newspaper *Malayala Manorama*'s article felicitating her promotion:

> *'Kerala, the state which appointed Smt. Anna Chandy 33 years ago as India's first woman judicial officer, has again created history today by appointing P K Thressia (47) as the country's first woman chief engineer. The cabinet today decided to appoint Thressia as the Chief Engineer of Irrigation in place of Shri. A Haridas, who is currently on leave. Thressia is currently the Superintending Engineer of Kozhikode Roads and Buildings.'*

The article continued:

> *'I started working at a time when it was rare to find women in the Services. However, I have never had to regret the fact that I am a woman,' says the illustrious woman chief engineer when contacted for felicitations at Kozhikode as she shared with us memories of her work life. 'I was in office for only about three months. However, by then I understood that an engineer's life is not as difficult as many women think,' she added.*

In becoming Kerala's chief engineer in the PWD, Thressia also earned the distinction of becoming the first woman in all Asia to serve as the chief engineer of a state public works department.

Thressia served as chief engineer in the Roads and Buildings department for eight years. During this time, every year, there were at least 35 new bridges commissioned. Many projects to build roads, as well as hospitals and schools, were completed. One of these was the women's and children's hospital associated with Kozhikode Medical College. During this time, the construction of six civil stations (district headquarters) were started at Kannur, Kozhikode, Malappuram, Palakkad, Ernakulam, and Idukki.

Thressia pioneered the first trial stretch of rubberized bitumen road in Kerala. She served as a member of the Specification & Standards Committee of the Indian Road Congress and took an active part in the conferences.

After serving as an engineer in the Kerala Public Works Department (PWD) for 34 years, Thressia retired in 1979.

She settled down in Ernakulam after retirement and was one of the founding consultants of a company called Taj Engineers.

Thressia's Family

Thressia lost her father in August 1946, three years after completing her university studies. After that, her mother Kunchalichy single-handedly took care of the family.

Thressia never married. You could say she was wedded to her career, but also enjoyed traveling and learning about different cultures.

Thressia dressed as a "Kashmiri"

Image courtesy of Ojus Job

She also enjoyed spending time with her siblings, and her sisters' children. Ojus, her older sister Mary's son, along with Col. N.D. Winny (Retd.), the son-in-law of her younger sister Baby, collected and shared the details of Thressia's extended family for this story. Only two of Thressia's siblings had children. Mary's older son Ojus completed his graduate degree from Imperial College, London, and worked in the petrochemical, aero-engine, automobile, embedded and renewable energy fields and is now retired. His brother Thaejus is a retired professor and is a consultant in the field of anaesthesia. Baby's daughter Anna and son Thomas had both graduated from college and worked in the fields of education and marketing. Ojus looks back upon Thressia fondly as a 'guiding beacon' to the youngsters in the family. The niece and nephews looked up to her for inspiration.

After Retirement

Thressia lived only for a couple of years after her retirement. In 1981, she was diagnosed with a brain tumour. Surgery was performed in Boston, USA, after which she returned to Ernakulam. Unfortunately, her condition became worse, and she had to be admitted to St John's Medical College Hospital in Bangalore. She was in a coma for about a month and finally passed away on 18 November 1981. She was buried in Edathiruthy along with her parents and some of her siblings.

A Life Dedicated to Quality Work

Thressia lived her life excelling at her craft. The images of her on scaffoldings in her white saree, inspecting the quality of the constructions under her watch, were legendary. Even after retirement, she was called upon to extend her service. For every woman who faces a lot of difficulties and roadblocks to career advancement, Thressia stands as an example of what you can achieve with dedication.