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From Roorkee/Thomason College to IIT Roorkee
(1847 – 2001 Onwards)

Contribution of Alumni in Development Activities of Nepal: A Historical Journey

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I. Contextual Background: The Genesis of IITR in the Form of Roorkee College

Back in 2022, we celebrated the 175th year of IIT Roorkee in Kathmandu, an occasion attended by the academic fraternity led by Director Prof. Ajit Kumar Chaturvedi, along with high-ranking officials of the Indian Embassy in Kathmandu. Today we gather again, almost 180 years on, to reflect on this theme:

the accomplishments and glorious contributions of the alumni to Nepal's development, mapped against the different phases of IIT Roorkee's institutional evolution. It helps, first, to look back at how IIT Roorkee (IITR) itself began, as background for today's theme.

During the British regime, James Thomason, an administrator of the East India Company and Lieutenant-Governor of the North-Western Provinces, proposed a civil engineering college at Roorkee in 1847. It turned out to be the first engineering college in Asia (then the British Empire) and one of the first institutions of its kind in the world. Credit is also due to Sir P.T. Cautley, the officer responsible for building the famous Ganga Canal, an engineering marvel in its own right. An acute need for engineers to construct the canal gave birth to the Roorkee college, which evolved from the Roorkee College of Civil Engineering in 1847, to the Thomason College of Civil Engineering in 1854, to the Thomason College of Engineering in 1947, to the University of Roorkee in 1949, and finally to IIT Roorkee in 2001.

Roorkee was then little more than a mud-built village 30 km from Hardwar, yet it soon became synonymous with engineering, both civil and military. In 1853, it became the headquarters of an army corps of engineers known as the Bengal Sappers and Miners.

References:

- K.V. Mital (2020). History of Thomason College of Engineering (1847 – 2001). Roorkee: Indian Institute of Technology, India.

- K.V. Mital (2020). History of Roorkee University (1949 – 96). Roorkee: Indian Institute of Technology, India.

II. Formal Relations of the Nepalese Regime with the Thomason College

Kumar Narsingh Rana and Kishor Narsingh Rana, popularly known as the "celebrated Narsingh brothers," enrolled at Thomason College during the last decade of the 19th century and graduated in 1895. Their enrolment seems to have paved the way for a lasting academic association with the Thomasonian institution. Nephews of Jung Bahadur Rana, the first Rana prime minister, their pursuit of engineering education appears to reflect a broader need to develop and modernize Nepal's rudimentary infrastructure.

A paper published in the IITRAAN Souvenir (2022) indicates that Jung Bahadur Rana's visit to London in 1850 helped set the stage for the engineering education of the Rana brothers. Jung Bahadur was keen on modernizing the country after what he had observed in England and France during that visit. Modern engineering history in Nepal can thus be traced to the graduation of the Narsingh brothers from Roorkee College. As one author has put it symbolically, 'Jung Bahadur discovers the Thomason College' as an instrument for realizing his vision for Nepal's development.

The Narsingh brothers are credited with prestigious projects across several engineering sectors, including palatial buildings, irrigation, railways, and hydropower, and their contributions were later recognized through a commemorative postage stamp in their honour. These early alumni blended European neo-classical styles with traditional elements to build iconic structures, including Singha Durbar and numerous historic palaces that still serve as government ministries today.

The relationship with the Thomason College strengthened further after Bir Shumsher, Jung Bahadur's nephew, became prime minister in 1885. According to Prof. K.V. Mital's book, History of Thomason College of Engineering, a clock presented by 'Sri Bir Shamsher Jung Rana Bahadur of Nepal' was installed on the dome of the college's iconic main building during renovation and construction work that began in 1896. It remains a lasting symbol of the historical bond between the Nepalese regime and Roorkee College.

The same book records that the then Prime Minister of Nepal contributed Rs. 2,500 to the building fund supporting large-scale construction at Thomason College in 1896. Records also show that Prime Minister Bir Shumsher JBR (1885 – 1901) maintained cordial relations with the college thereafter, paving the way for more Nepalese students to pursue engineering education at Roorkee. The engineers who followed the Narsingh brothers included Brigadier Col. Dilli Jung Thapa (1911) and Col. Surya Jung Thapa (1926), celebrated Thomasonians who graduated during the first hundred years of Roorkee/Thomason College, from 1847 to 1947. However, little information is available about other engineers from the Thomason College phase.

III. Various Phases of Institutional Building of IITR, and Nepal's Corresponding Political Transformations

There are interesting parallels between IIT Roorkee's institutional development and Nepal's political transformation over roughly a century and a half, from the late 19th century to the present. The Thomason College phase (1847 – 1949) corresponds to the Rana regime in Nepal, followed by the UoR phase (1949 – 2001), which can be linked to the dawn of democracy in the country in 1951. This was followed by three decades of the Panchayat system, then the multiparty system under a constitutional monarchy, and eventually the federal republican order established in 2006.

IV. A Foundational Role of IIT Roorkee in the Modernization of Nepal

The Indian Institute of Technology Roorkee, formerly the Thomason College of Civil Engineering and later the University of Roorkee, holds a foundational role in the modernization of Nepal. For over a century, its graduates have served as the "chief architects, structural visionaries, and energy pioneers" who shaped Nepal's physical and economic landscape, transforming raw topography into a resilient nation.

In the late 19th and early 20th centuries, Nepal lacked local, formal engineering institutions. Rana administrators turned to Asia's oldest engineering college at Roorkee to train the country's brightest minds, since it was the institution best placed to help modernize Nepal's rudimentary infrastructure.

From early Rana-era palaces to the nation's contemporary "National Pride Projects," the spirit of excellence carried by these alumni has continued to drive Nepal's development. Close to 500 Nepali engineers have graduated from this prestigious institution, originally founded as the Thomason College of Civil Engineering, over the last 180 years, with contributions spanning the entire evolutionary timeline of Nepal's modern infrastructure.

IITR's foundational role in Nepal's modernization, carried out through its alumni, has naturally been shaped by the country's complex politico-economic realities, which broadly track Nepal's political transitions alongside IITR's own institutional changes. The accomplishments and contributions of Nepalese Roorkee alumni engineers, corresponding to each phase of IIT Roorkee's evolution, are addressed in the sections that follow.

V. The Thomason College Phase (1847 – 1949): Pioneering Nepalese Civil Engineers

This is a pivotal phase in the deep historical bond between the Nepalese regime and the Roorkee institution, marking the earliest accomplishments and contributions of Nepalese Roorkee alumni to Nepal's development. It was not an easy task, however, to uncover the past professional achievements of these pioneering engineers of the Thomasonian era (1847 – 1947).

Engineer Bhubanesh Kumar Pradhan and Mr Subodh SJB Rana, through their commendable research, brought the Narsingh brothers' contributions to light in papers examining historical, technical, and political perspectives. Similarly, valuable information about Col. Dilli Jung Thapa (1911) was obtained from his granddaughter, Ms Chanda Rana, who plans to publish a comprehensive book on her grandfather's accomplishments. Information about Col. Surya Jung Thapa (1926) was obtained from his son, Brig. General (Retd.) Tejendra Jung Thapa. All those who contributed to updating this historical record of the celebrated Thomasonians deserve recognition for their support and cooperation.

The prominent contributions of these four pioneering engineers, who received their engineering education at Roorkee across roughly thirty years spanning the late 19th and early 20th centuries, are outlined below. The late Er. Dipti Jung Thapa, himself an Ex-Tho and the son of Col. Dilli Jung, identified, in a book he authored, twelve important physical infrastructure structures built under his father's supervision.

After graduating from Roorkee in 1911, Brigadier Colonel Dilli Jung Thapa became Nepal's first civil engineering graduate and Chief Engineer, going on to execute some of the country's most pioneering infrastructure using manual labour and local materials, long before modern machinery reached the Himalayas. He designed and supervised the Churia (Churiyamai) Tunnel (1917), a 500-metre highway tunnel carved through the Siwalik Range using hand tools. It was Nepal's first road tunnel, linking the Terai plains to Bhimphedi. He also led construction of the Hetauda to Kathmandu ropeway, an early aerial cargo lifeline into the landlocked Kathmandu Valley, and was the lead designer of the Chandra Nahar Canal in Saptari district, Nepal's first modern canal-based irrigation network. Following the devastating 1934 earthquake, he was also involved in the structural restoration of Kathmandu's heritage buildings, including the Dharahara tower.

VI. The UoR Phase (1949 – 2001): Modernization Drive in Nepal's Infrastructure Development

Nepal's politico-economic realities shifted a great deal over this half-century, yet the pace of infrastructure development held up remarkably well. That suggests just how immense the contribution of Nepalese Roorkee alumni has been throughout Nepal's history.

During the 1950s, after democracy arrived in Nepal, a good number of Nepalese students kept enrolling at Roorkee under the Colombo Plan, a practice that continued into the 1970s. During the 1980s, a significant milestone in Nepal's engineering history unfolded when a large cohort of Nepalese students was sent to study at the University of Roorkee. Between 1980 and 1984, approximately 250 students were enrolled for BE studies specifically for the Karnali Hydropower Project funded by UNDP alongside an additional 50 students from the irrigation sector funded

by the World Bank. This mass enrollment drive helped to build a highly qualified pool of technical human resources capable of executing large-scale national development initiatives.

Although the proposed Karnali Hydropower Project could not be implemented due to benefit sharing issues, the knowledge these engineers received was not wasted. Upon returning to Nepal, the graduates integrated into key public-sector institutions, including the Department of Irrigation, water supply agencies, the Nepal Electricity Authority (NEA), and the Department of Roads. This influx of skilled technical personnel laid the foundation for modern engineering administration and infrastructure delivery across the country. Over the following decades, these University of Roorkee alumni played a central role in transforming Nepal's physical landscape, from the high Himalayas to the Terai plains.

VII. The IIT Roorkee Phase (2001 onwards)

Once the mass-enrolment model used for the Karnali Project was phased out, Nepal's engagement with IIT Roorkee carried on through India's ITEC (Indian Technical and Economic Cooperation) programme. Instituted in 1964, ITEC has grown substantially in scope since the 2000s, now offering individual, scholarship-based placements rather than mass enrolments. Under this arrangement, engineers from Nepal's Department of Water Resources and Irrigation continue to be sent to IIT Roorkee's Department of Water Resources Development and Management to pursue master's degrees, with professionals from irrigation, water resources management, environmental management, and hydropower using the programme to build skills intended to benefit their sector back home.

VIII. Key Milestone Projects Carried Out by the Alumni

Hydropower Sector

- Kulekhani Storage: the first project with a high dam (114 m), with a total capacity of 106 MW across three cascade schemes.
- Marshyangdi: a 69 MW run-of-river project built in 1989.
- Upper Tamakoshi Hydroelectric Project: the largest hydropower project under NEA at 456 MW, built with domestic financing.
- Kali Gandaki A: a 144 MW hydro project built in 2002, with major input from Roorkee alumni in both NEA and the consultant team.
- Upper Trishuli 3A: 60 MW, built in 2019 with a soft loan at almost the same cost despite the earthquake.
- Khimti (60 MW), Upper Bhote Koshi (45 MW), and Chilime (22 MW), which heralded the increasing role of the private and public sectors in the power sector. A number of private-sector projects are currently under construction with major investment, planning, and design input from IITR alumni.

Irrigation Sector

- Structural design of the pumping station for the Koshi Pump Irrigation Project, 1981.
- Bagmati Irrigation Project, which secured upper riparian rights.
- Sunsari Morang Irrigation Project during the 1990s.
- Bhairahawa Lumbini Groundwater Project during the 1980s.
- Kankari Irrigation Project and Rani Jamara Kularia Project, along with a number of hill irrigation projects.
- Sikta Irrigation Project, currently Nepal's largest ongoing irrigation scheme.
- Bheri Babai Diversion Multipurpose Project, Nepal's first project built using a Tunnel Boring Machine (TBM), with a 12.2 km tunnel completed about a year ahead of schedule. On completion it will irrigate 51,000 hectares in Banke and Bardiya and generate 48 MW of electricity. It is followed by the Sunkoshi Marin Diversion; both are multipurpose projects with power and irrigation benefits.

Transport Sector

- Nepal Army built the Trishuli Somdang road in late 1980s and the task was led by col. Hem B. Karki (1962 batch). This road opened the path for hydropower development in the Trishuli basin.
- East-West Highway, the first trunk line connecting the entire country along the foothills of the mountains and Nepal's economic and social lifeline.
- Upgrading of the Ring Road to a six-lane road to alleviate congestion.
- Nagdhunga Tunnel, recently completed.
- Kathmandu–Terai Fast Track, being built to connect with the new international airport.
- Upgrading of Tribhuvan International Airport and Gautam Buddha International Airport.

Water Supply Sector

- Melamchi Project, which involves a 27 km tunnel, a distribution system in the valley, and a large number of urban and rural water supply schemes.

Housing and Urban Planning

- Major projects including the 22-floor Silver City (Kalikasthan, Kathmandu).
- Structural design and supervision of the 22-storey Dharahara, 72 m in height with two basements, reconstructed after its demolition in the 2015 earthquake.
- Sanchaya Kosh Complex.
- Design of a prefabricated, steel-section, portal-framed structure for 6,000 classrooms across Nepal's different geo-zones in 1988, for the ERREP Project of the Department of Housing and Physical Planning, funded by the World Bank.

Education Sector

- IITR alumni have been instrumental in establishing engineering institutions such as NEC, as well as in academic work at IOE and other institutions.
- Recent collaborative MoUs between IIT Roorkee and Tribhuvan University (IOE).

IX. Concluding Remarks

The journey from Roorkee College, established in 1847, to today's IIT Roorkee offers an instructive case study for developing countries, including Nepal. There are valuable lessons for countries in the process of building their own institutions in the engineering and technology sectors.

IIT Roorkee is a premier academic institution, not just for India but for the wider South Asia region, and it is unique in combining an engineering and technology heritage built over more than a century with the 21st-century dynamism of India's IIT campuses. It is well placed to play an innovative and proactive role in collaborating with Nepal's engineering institutions to enhance the quality of their education and strengthen their R&D capabilities.

The contribution of IIT Roorkee alumni to Nepal's development has been glorious, from a number of palaces and irrigation schemes, to the country's first road tunnel in the 20th century, to mega-projects such as Upper Tamakoshi Hydro, Upper Trishuli Hydro, the Terai Fast Track, and the Bheri Babai Diversion. Through it all, these alumni have carried a spirit of excellence and contributed with flying colours, leaving an indelible mark on Nepal's infrastructure as the country continues on its path toward modernization.