Newsletter
Issue-08

CoE RBAT

Centre of Excellence for Roads, Bridges, Airfields and Tunnels

This Issue

Double Lane, Class-70R Indigenous Modular Bridges in BRO

Introduction

1. In remote border areas where the Border Roads Organisation (BRO) operates, building infrastructure is no small feat. Harsh weather conditions, limited working time, and the remote nature of these locations create significant challenges for construction projects. In these demanding environments, the advantages of indigenously developed Double Lane Cl-70R Modular Bridges become apparent, especially when compared to traditional concrete bridges.

2. Border Roads Organisation and Garden Reach Shipbuilders & Engineers (GRSE) Ltd signed a Memorandum of Understanding (MoU) for two-year for fabrication, supply, erection and launching of 75 double lane galvanised modular bridges of 7.50 meters carriage way with IRC Load Cl-70R at 1/3rd of the cost of an imported bridge.

3. One of the most important and critical advantages of the MoU will be the time factor as these bridges can be launched within 10 days of handing over the sites. This will certainly be a game-changer in road infrastructure development in the country.

4. At present, the max span of these bridges is 140 ft. Successful trials have already been conducted for spans upto 190 ft. However, trials are underway for a span of upto 200 ft and if successful, these will be incorporated in BRO's inventory.

MoU with GRSE for Indigenous CL-70R Double Lane Modular Bridges

5. **Policy for Construction of Modular Bridges in BRO**. A policy has been formulated by HQ DGBR mandating construction of Cl-70R Modular Bridges on all Cl-9/NHSL roads for spans upto 140 ft while for spans beyond 140 ft, 70 permanent bridges have been mandated. The same will undergo a change once trials of Cl-70R D/L Modular Bridges of 200 ft span are successfully conducted. This will ensure, that as and when these roads are upgraded, the bridges on the water gaps along these roads are strong enough to cater for movement of all types of heavy vehicle, plant & equipment as also to permit bidirectional regular traffic so that these bridges do not become bottlenecks.

6. **A Step towards Aatmanirbhar Bharat.** Taking the first step towards Aatmanirbhar Bharat, BRO launched a Cl-70R Single Lane Modular Bridge of span 190 ft on Dharasu-Gangotri road in Uttarakhand and 140 ft span Double Lane Modular Bridge on Flag Hill-Dokala road in Sikkim, which is the first of its kind. This has set the stage for completion of more such bridges and in a short span of just under two years, BRO has completed 20 such bridges.

Upgraded 140' DL Modular Bridge Cl-70R on Flag Hill - Dokala Road (P) Swastik

7. **Some of the major advantages of Modular Bridges are as follows:-**

(a) **Enhanced Load Class**. Conventional Bailey Bridges are generally upto load Cl-40R which is insufficient for move of heavy Artillery guns, Armored Personnel Carriers (APCs) and Tanks. Therefore, Modular Bridges of load Cl-70R are sufficient for move all types of guns/vehs/eqpts of the Armed Forces.

(b) **Rapid Construction.** The most significant advantage of the Double Lane Cl-70R Modular Bridges is their rapid construction. Traditional concrete bridges, besides requiring tech expertise, also require extensive on-site concrete mixing and curing, which can be severely affected by unpredictable weather conditions in remote areas. In contrast, modular bridges are pre-fabricated and assembled on-site, significantly reducing construction time. This quick assembly minimizes the risk of weather-related delays and allows to maintain project schedules even in challenging environments.

(c) **Weather-Resistant Materials.** The materials used in the construction of Double Lane Cl-70R Modular Bridges are carefully chosen to withstand extreme weather conditions, including heavy snowfall, torrential rains, and temperature fluctuations. These bridges are designed to be corrosion-resistant, ensuring longevity and minimal maintenance. This weather resilience is crucial in remote border areas where access for repair work can be limited.

(d) **Minimal Dependence on Contractors.** Contractors are often hesitant to work in remote areas due to logistical challenges and the associated costs. Modular Bridges reduce BRO's reliance on contractors as the bridges can be assembled by in-house teams, saving both time and money. This self-reliance empowers the BRO to maintain control over construction projects, even in the most remote locations and reduces the risk of project delays due to unavailability of contractors.

(e) **Reduced Environmental Impact.** The construction of traditional concrete bridges can have significant environmental footprints, with the need for heavy machinery and the transportation of large quantities of materials. Modular Bridges, on the other hand, require fewer on-site resources and are designed to minimize environmental impact. This is particularly relevant in remote areas, where preserving the natural environment is of utmost importance.

Conclusion

8. Indigenously developed Double Lane Cl-70R Modular Bridges are a game-changer for the Border Roads Organisation's infrastructure projects in remote border areas. Their rapid construction, weather-resistant materials, reduced reliance on contractors, minimal environmental impact, and exceptional durability make them a superior choice over conventional concrete bridges in challenging environments. These bridges will provide essential connectivity to meet strategic needs of our Armed Forces and will further boost socio-economic upliftment of the local population in the far flung border regions. By embracing innovative solutions like Modular Bridges, the BRO can overcome the unique challenges posed by weather, limited working time, and contractor reluctance, ultimately ensuring that remote border areas are better connected with higher load carrying capacity bridges.

Glimpses of Modular Bridges Completed so far

Upgraded 80' DL Modular Bridge Cl-70R at Km 4.400 on Kargil Town Bypass Road (P) Vijayak

Upgraded 110' DL Modular Bridge Cl-70R at Km 2.720 on Dah - Yaldhor - Ganasok - Boulder Road (P) Vijayak

Upgraded 110' DL Modular Bridge Cl-70R at Km 9.612 on Dah - Yaldhor-Ganasok-Boulder Road (P) Vijayak

Glimpses of Modular Bridges Completed so far

Upgraded 130’ DL Modular Bridge Cl-70R at Km 71.900 on Sanku – Kunore - Sapila - Mulbek Road (P) Vijayak

Upgraded 70’ DL Modular Bridge Cl-70R at Km 16.850 on Hanuthang - Handenbroke Road (P) Vijayak

Upgraded 70’ DL Modular Bridge Cl-70R at Km 14.250 on Langru - Photoskar - Niraq Road (P) Yojak

Glimpses of Modular Bridges Completed so far

Upgraded 70' DL Modular Bridge Cl-70R at Km 35.100 on Nimmu - Padam - Darcha Road (P) Yojak

Upgraded 70' EWSL Modular Bridge Cl-70R at Km 26.800 on Tato - Manigong - Tadadege Road (P) Brahmank

Upgraded 80' EWSL Modular Bridge Cl-70R at Km 33.380 on Tato - Manigong - Tadadege Road (P) Brahmank

Glimpses of Modular Bridges Completed so far

Upgraded 100’ DL Modular Bridge Cl-70R at Km 41.00 on Tato - Manigong - Tadadege Road (P) Brahmank

Upgraded 50’ DL Modular Bridge Cl-70R at Km 50.100 on Tato - Manigong - Tadadege Road (P) Brahmank

Upgraded 50’ DL Modular Bridge Cl-70R at Km 65.400 on Tato – Manigong - Tadadege Road (P) Brahmank

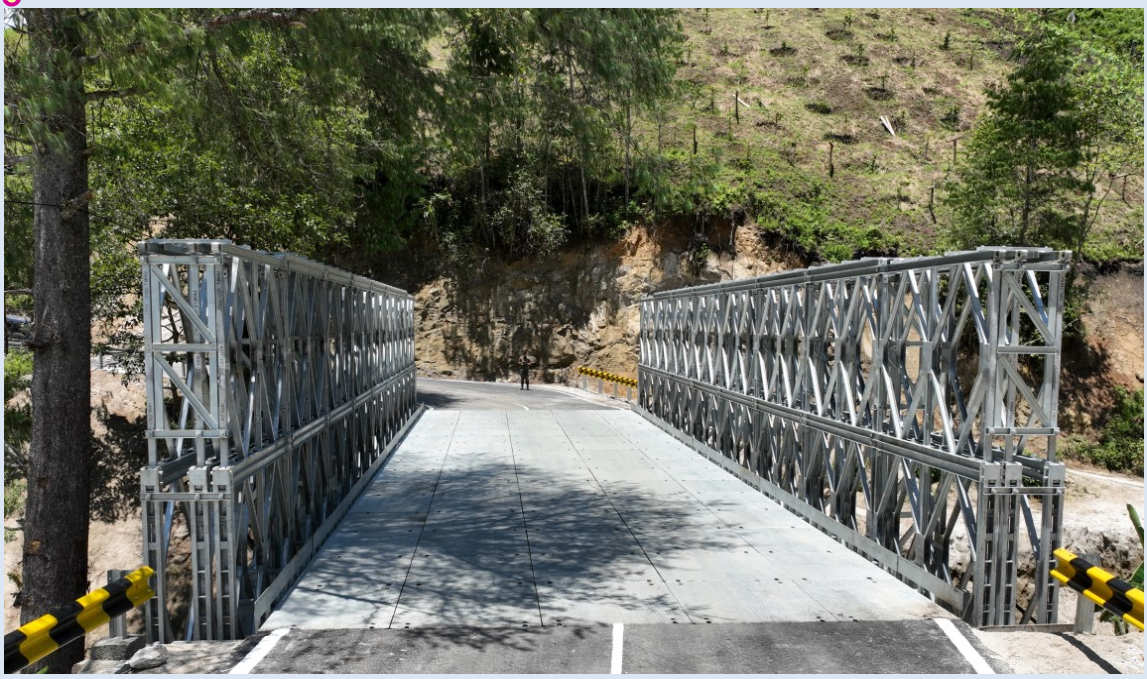
Glimpses of Modular Bridges Completed so far

Upgraded 60’ DL Modular Bridge Cl-70R at Km 84.450 on Tato - Manigong - Tadadege Road (P) Brahmank

Upgraded 60’ DL Modular Bridge Cl-70R at Km 85.450 on Tato - Manigong - Tadadege Road (P) Brahmank

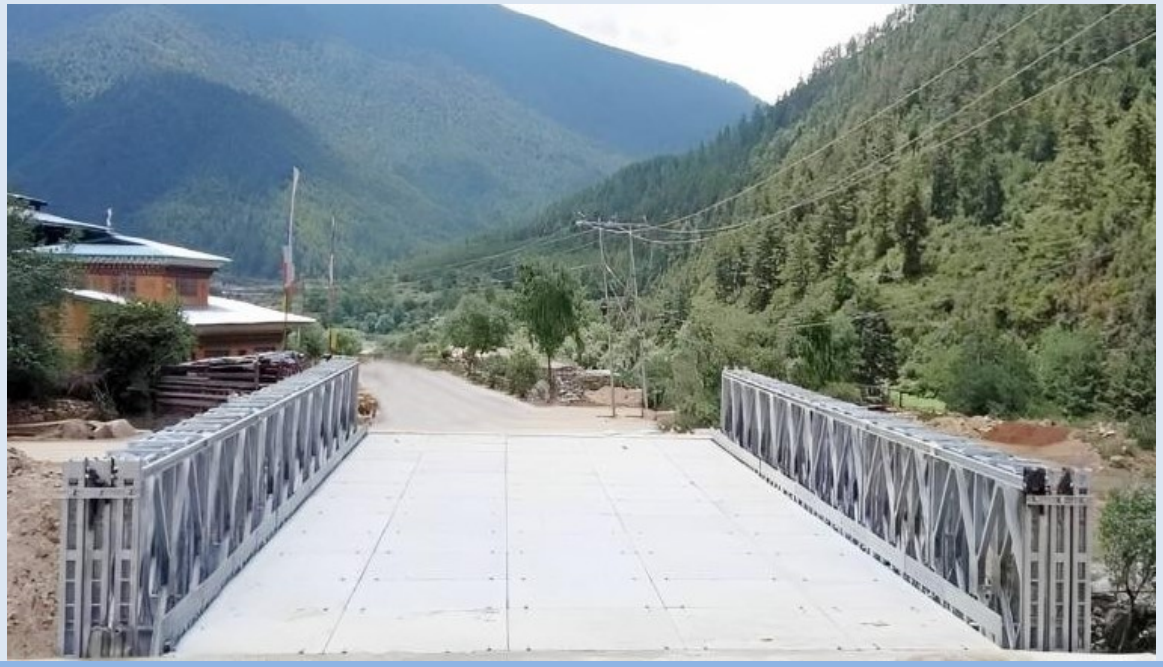
Upgraded 80’ DL Modular Bridge Cl-70R at Km 28.715 on Anini - Mipi Road (P) Udayak

Glimpses of Modular Bridges Completed so far



Upgraded 80’ DL Modular Bridge Cl-70R at Km 29.875 on Anini - Mipi Road (P) Udayak

Upgraded 80’ DL Modular Bridge Cl-70R at Km 35.700 on Anini - Mipi Road (P) Udayak



Upgraded 60’ DL Modular Bridge Cl-70R at Km 71.175 on Chuzom - Haa Road (P) Dantak

Upgraded 70’ DL Modular Bridge Cl-70R at Km 53.170 on Tato-Manigong-Tadadege Road (P) Brahmank

Upgraded 60’ DL Modular Bridge Cl-70R at Km 73.145 on Chuzom - Haa Road (P) Dantak

Lecture Series

Lecture Series No	Date of Lecture	Panel of Expert	Subject
12th	26 Apr 2023	Shri SS Prasad, EE(C), SO to ADGBR (HQ)	Road Geometrics & Aesthetics.
13th	26 May 2023	Shri KK Sharma, EE(C), JD (East Dte)	Challenges in the construction of Sela Tunnel
14th	27 Jun 2023	Shri H Murthy, SE(C), Dir (Br & Tnl), CE (P) Arunank	Importance of Collecting Correct Hydraulic Data

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