

Design of Mitigation Measures to Reduce Earth Pressure on Retaining Wall Constructed for Arpinchala Station Yard

Dharam- Qazigund Section, J & K

TYPE OF PROJECT
Reinforced Soil Walls And
Slope Reinforcement

YEAR OF CONSTRUCTION
2021

CLIENT
Ircon International Limited.

CONTRACTOR

DESIGNER
Genstru Consultants PVT
LTD

PROD. RELATED

MonoAxial GeoGrids (PraGrid HF/ ParaLink- 155398 Sqm), Nonwoven Geotextiles (Mactex- 13340 Sqm), Drainage Geocomposites (MacDrain - 9000 Sqm)

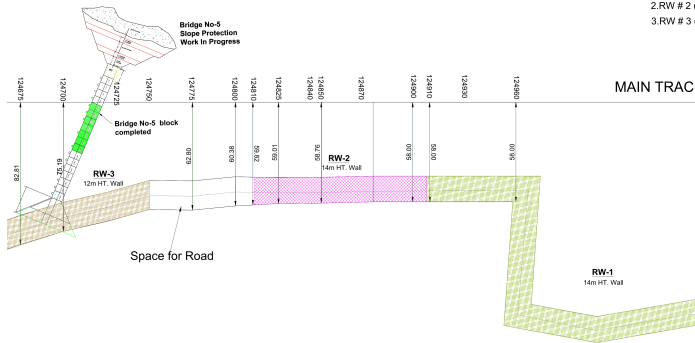
Challenge

The Jammu-Udhampur-Katra-Quazigund-Baramulla Railway line is the biggest project in the construction of a mountain railway since independence. From Jammu to Baramulla, length of the new rail line is 345 km. The terrain passes through young Himalayas, which are full of geological surprises and numerous problems.

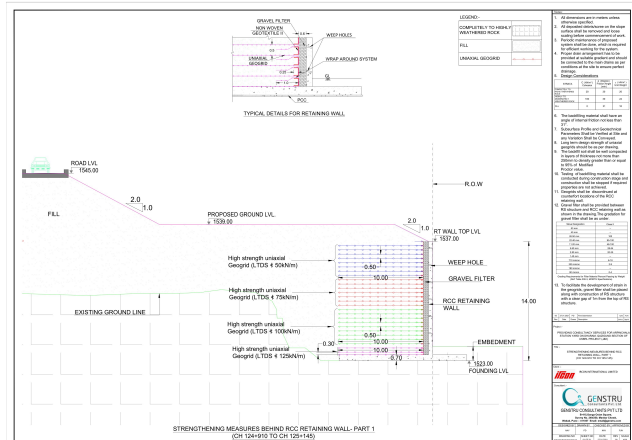
The project comprises of route in tunnels, bridges, cuttings and embankments. RCC retaining wall are designed and constructed for Arpinchala station yard on Dharam- Qazigund section of USBRL project (J&K) in order to retain the fill. The design was carried out by considering angle of friction of back fill material as 40 degrees. But Frictional value of back fill material available at site is 30-31 degree, as per investigation carried out for fill material. So, there arise a need to reduce the earth pressure coming on to retaining wall to ensure stability of the structure.

ARPINCHALA RETAINING WALL

NOTE:-
FIRST PR
1. RW # 1
2. RW # 2
3. RW # 3



Plan Drawing



Typical Cross Section 1

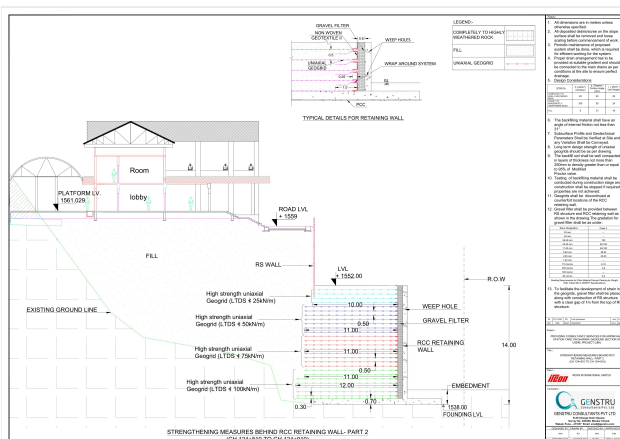
Solution

It has been proposed to construct a reinforced soil structure (RS structure) with wraparound system behind RCC wall to reduce the earth pressure coming on to the wall.

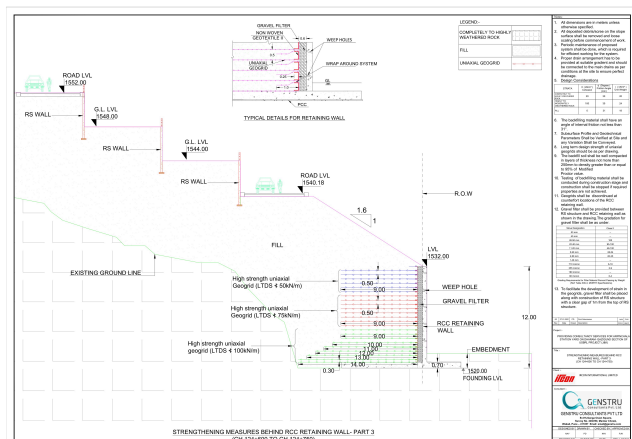
RS structure comprises of frictional backfill material reinforced by linear flexible geogrids generally placed horizontally. The additional earth pressure coming on to the RCC wall would be resisted by the geogrids thereby reducing the pressure on the wall. The RS structure design has been carried out by finite element method and limit equilibrium method. The length, strength and spacing of geogrids has been provided in order to achieve the recommended factor of safety in terms of global stability, internal stability and external stability.

To minimize the earth pressure getting transferred to the RCC wall, a gravel filter layer of 600mm thickness is also placed between proposed RS structure and RCC wall.

Linear flexible geogrids are unique planar structures consisting of a monoaxial array of composite geosynthetics strips. They are amongst the most tried and tested geogrids in the world offering 120-year design life and high performance. The incredibly tough polyethylene sheath is resistance to physical, chemical, and biological conditions found in reinforced soil structures.



Typical Cross Section 2



Typical Cross Section 3



Laying of ParaLink



Placing of Geotextile and Laying of ParaLink



Use of Plate compactor near to structure



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