

Restoring Critical Road Connectivity Under Severe Access Constraints: Experience from the 2026 Trishuli–Bhotekoshi Disaster, Nepal

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Abstract: The 2026 Trishuli–Bhotekoshi disaster severely disrupted major road corridors in Nepal, affecting highway connectivity, international trade, and essential supply chains. Preliminary assessments by the Department of Roads identified approximately 50 km of affected road sections along the Galchhi–Rasuwadgaadi corridor. Major damage included bridge failures, road washouts, riverbank erosion, landslides, and extensive debris deposition. These conditions created significant challenges for emergency restoration, particularly due to restricted access and unstable ground conditions. Along the Gerku–Bhaise–Betrawati section, severe river-toe erosion and landslides made restoration along the original road alignment impractical. Temporary realignments, approximately 4 km of access tracks, gabion launching, and boulder placement were adopted to support restoration activities. Two working fronts advanced from Bhaise and Betrawati, eventually establishing access for subsequent Bailey bridge works. Alternative rural roads helped restore essential connectivity towards Rasuwa within the first week. Similarly, the Prithvi Highway experienced extensive damage, particularly at Krishna Bhir, where temporary road construction enabled the restoration of two-way traffic. The recovery experience highlights the importance of rapid damage assessment, alternative access routes, ground stability, and coordinated restoration activities in improving road connectivity and infrastructure resilience in mountainous regions.

Keywords: *Trishuli–Bhotekoshi disaster, Road connectivity, Emergency restoration, Riverbank erosion, Landslides, Temporary road realignment, Infrastructure resilience.*

Introduction

The 2026 Trishuli–Bhotekoshi disaster caused extensive disruption to major road corridors in Nepal, significantly affecting national highway connectivity, international trade, and essential supply chains. The disaster resulted in widespread damage to road infrastructure, including bridge failures, road washouts, riverbank erosion, landslides, and extensive debris deposition. Preliminary assessments conducted by the Department of Roads indicated that approximately 50 km of road sections along the Galchhi–Rasuwadgaadi corridor were affected, although detailed verification of the damage remained necessary. The scale of destruction created major challenges for emergency restoration, particularly in areas where damaged bridges, unstable

slopes, and limited accessibility restricted the movement of construction equipment and personnel.

Similarly, the Prithvi Highway, an important supply corridor connecting Kathmandu Valley, experienced extensive damage from debris deposition, road washouts, and riverbank erosion. At Krishna Bhir, severe river-toe erosion resulted in road formation failure, making the construction of a new temporary track necessary. The restoration of two-way traffic following trial operations played an important role in re-establishing connectivity along the highway.

The experiences from the disaster demonstrate the importance of rapid damage assessments, aerial reconnaissance, field inspections, and coordinated restoration activities in responding to severe infrastructure damage. They also highlight how alternative routes and temporary access arrangements can support essential transportation when primary highways remain disrupted.

Emergency road restoration and access challenges

Emergency road restoration following the 2026 Trishuli–Bhotekoshi disaster was complicated by extensive infrastructure damage and severe accessibility constraints. Bridge failures fragmented the road network, making it difficult to transport construction equipment and materials to affected locations. Landslides, riverbank erosion, and debris deposition further restricted access, while unstable ground conditions limited the availability of safe working areas. These challenges influenced the selection and sequence of restoration activities, requiring temporary arrangements before permanent infrastructure works could proceed.

Along the Gerku–Bhaise–Betrawati section, severe river-toe erosion and landslides destroyed portions of the existing road formations. The extent of damage made restoration along the original alignment impractical, particularly because sufficient working platforms were unavailable. To overcome these difficulties, temporary road realignment was carried out through available public land. Approximately 4 km of

temporary tracks were developed to establish construction access, while sacrificial gabion launching and boulder placement were used for river-toe protection. These measures supported emergency restoration in areas affected by erosion and ground instability.

Restoration activities were also organized through two independent working fronts advancing from Bhaise and Betrawati towards each other. This arrangement allowed construction activities to progress from separate accessible locations despite the disruption of the original road network. The eventual connection of these working fronts established the access required for subsequent Bailey bridge works. Meanwhile, alternative rural roads played an important role in restoring essential connectivity towards Rasuwa within the first week, demonstrating the value of available secondary routes during major highway disruptions.

The Prithvi Highway faced similar restoration difficulties due to extensive debris deposition, road washouts, and riverbank erosion. At Krishna Bhair, severe river-toe erosion caused failure of the road formation, requiring the opening of a new temporary track. Following trial operations, two-way traffic was restored for all vehicle categories, re-establishing connectivity along this critical supply corridor. The restoration experience demonstrates how ground stability, accessibility, and bridge availability directly influence emergency construction priorities and the sequence of recovery activities.

Conclusion

The 2026 Trishuli–Bhotekoshi disaster caused extensive damage to critical road infrastructure in Nepal, disrupting highway connectivity, international trade, and essential supply chains. Bridge failures, landslides, riverbank erosion, road washouts, and debris deposition created significant challenges for emergency restoration, particularly where unstable ground conditions and limited accessibility prevented conventional reconstruction along existing road alignments.

The restoration activities along the Gorkhu–Bhaise–Betrawati section and the Prithvi Highway highlight the importance of temporary road realignments, alternative access routes, river-toe protection measures, and coordinated construction activities. The development of temporary tracks, the connection of independent working fronts, and the restoration of two-way traffic at Krishna Bhair demonstrate how practical emergency measures helped re-establish essential connectivity despite severe physical constraints.

Overall, the recovery experience emphasizes the importance of considering ground stability, physical accessibility, and bridge availability when planning and prioritizing road restoration activities. The early restoration of essential access through alternative rural roads, despite prolonged disruptions to primary

highways, also demonstrates the value of network redundancy. These lessons highlight the need for resilient highway infrastructure and effective emergency restoration planning to maintain critical road connectivity in Nepal's mountainous regions.