The Reinforced Earth® technique, recognised as a major innovation in the field of civil engineering, provides numerous structural solutions for owners and contractors ranging from retaining walls to bridge abutments. As the world leader in mechanically stabilized earth, Terre Armée Group has a presence in all five continents and has the advantage of both local and international expertise. This wealth of expertise has led the company to develop processes offering common advantages:

- Reliable and sustainable materials
- Savings in terms of time and resources
- Capacity to adapt to complex situations
- Integration into the environment, in particular due to an extensive range of panel finishes

The Reinforced Earth® technique has revolutionized structural design and is applicable for all kinds of structures:

- Road
- Railway
- Marine and waterway
- Industrial and protective

Our goal is to create, design and supply innovative techniques to the civil engineering industry with a strong commitment to excellence in design, service and public welfare.
The TerraLink™ technique allows the construction of Reinforced Earth® walls in front of existing structures, with narrow space between them. Since the reinforced fill zone is not wide enough to accommodate conventional lengths of reinforcements, the acceptable solution consists in connecting the Reinforced Earth mass to the existing structure. The whole configuration, called TerraLink™, forms a shored retaining wall that ensures a sound structural behavior.

TerraLink™ elements are similar to those used for Reinforced Earth® solution: soil reinforcements (steel or geosynthetic), connected to modular facing systems (precast concrete panels, welded wire mesh and connection parts). These elements are placed between well compacted backfill layers. The main feature is that reinforcements are linked to the rear part (backface) of the system through the existing structure, which enables combination or continuity of the reinforcements between the narrow Reinforced Earth® wall and the existing structure.

Two types of linked system are possible
The choice of the appropriate system depends on several factors: geometrical site configuration, type of existing structures, and type of reinforcements among other considerations.

**Friction Link system**
Additional reinforcements are inserted between the reinforcement layers of Reinforced Earth® wall and attached to the existing structure. The overlaps between reinforcements ensure their frictional connection on both sides of the structure. This solution has the advantage to keep the flexibility of the combined wall system but requires sufficient space for overlaps of the reinforcements.

**Direct Link system**
The reinforcements of the Reinforced Earth® wall are directly connected to the existing structure. This solution easily adapts to very narrow or limited space but requires further precautions in terms of construction.

Adaptation to existing structure
The existing structure or natural feature against which the Reinforced Earth® wall is constructed has its importance to the TerraLink™ design, especially in determining the suitable technique for attachment of the reinforcements. The existing structure could be a soil nail wall, Reinforced Earth wall or other retaining wall, or an existing natural feature such as sloped terrain or bedrock. Whatever its origin, a specific assessment is required to ensure that the existing structure is safe enough or needs evaluation of the consolidated works to support the new load configuration.
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**Field of application**
The TerraLink™ system is an excellent alternative when site constraints prevent the construction of traditional gravity retaining walls. Its field of applications depends on environmental, technical and economic considerations.

**Widening of platform in urban environment**
Due to the increase of traffic, providing a widened of platform is often necessary. In restricted urban areas the construction of new ramps is often just in front of existing ramps. A standard retaining wall would have the drawback to partially dismantle the current ramp in order to build the new one. The TerraLink™ system enables the construction of the new ramp while keeping in place the existing wall, maintaining traffic use for most of the construction time.

The main advantages are:
- Reduced footprint at the base of the structure
- Minimal disruption of the traffic flow during construction
- Speed of construction
- Saving demolition of the current structure
- Reduction of select backfill volume

**Construction in steep topography context**
Another main application is the construction of retaining walls in sloped terrain such as an existing embankment, cut slope or rocky outcrop. A standard retaining wall solution requires wide and expensive earthworks, including costly excavations. The use of TerraLink™ system reduces the footprint compared to traditional solutions, and consequently the volume of excavated materials.

The decrease of excavation and backfill material make this technique both sustainable and economical.

The main advantages are:
- Reduced footprint at the base of the structure
- Economy of excavation works
- Decrease of excavated materials
  (Economy of recovery/landfill or treatment)
- Speed of construction
- Reduction of technical backfilling
- Continuity of facing appearance with other adjacent full volume Reinforced Earth walls
Two types of linked system are possible:

1. Friction Link system
   - Reinforcement strips are directly connected to existing structure.
   - Requires sufficient space for overlaps of the reinforcements.
   - Reinforcements ensure friction connection on both sides of the structure.
   - This solution easily adapts to narrow or limited space but requires further precautions in terms of construction.

2. Direct Link system
   - Reinforcement strips are directly connected to the existing structure.
   - Requires wide and expensive earthworks for overlaps of the reinforcements.
   - The shored retaining wall system forms that ensure a sound structural behavior.

The choice of the appropriate system depends on several factors:
- Geometrical site configuration
- Type of existing structures
- Type of reinforcements

Adaptation to existing structure
- Reinforced Earth® wall and attached to the existing structure.
- The overlaps between reinforcement layers are connected in front of existing structures, with narrow space between them.
- Since the reinforced fill zone is not wide enough to accommodate conventional lengths of reinforcements, the acceptable solution consists in connecting the Reinforced Earth® wall and the existing structure.

Reinforcements are directly connected to modular facing systems (precast concrete panels, welded wire mesh and connection parts). These elements are placed between well compacted backfill layers. The main feature is that reinforcements are linked to the rear part (backface) of the system through the existing structure, which enables combination or continuity of the reinforcements between the narrow Reinforced Earth® wall and the existing structure.

A specific assessment is required to ensure that the existing structure is safe enough or adaptable, and the site's specific conditions are taken into account.

The main advantages are:
- Speed of construction
- Minimal disruption of traffic flow during construction
- Reduced footprint at the base of the structure
- Economy of excavation works
- Decrease of excavated materials
- Reduction of technical backfilling
- Continuity of facing appearance with other adjacent full volume Reinforced Earth® walls
- Saving demolition of the current structure
- Reduction of select backfill volume
- Stabilization of the existing structure or natural feature against which the Reinforced Earth® wall is constructed has importance to the TerraLink® design, especially in determining the volume of excavated earthworks.

The main advantages are:
- The decrease of excavation and backfill material make this technique both sustainable and economical.
- The use of TerraLink® system reduces the footprint of the consolidated works to support the new load configuration.
- The field of applications depends on the type of site environment, technical and economic considerations.

The main advantages are:
- The field of applications depends on environmental, technical and economic considerations.
- Another main application is the construction of retaining walls in sloped terrain such as an existing embankment, cut slope or rocky outcrop.
- The choice of the appropriate system depends on several factors: geometrical site configuration, type of existing structures, and type of reinforcements among other considerations.

The TerraLink® technique allows the construction of Reinforced Earth® walls in various environments:
- Field of application
- Construction in steep topography context
- Widening of platform in urban environment
- N1 Gauteng Freeway widening, Johannesburg, South Africa
- Kemerhisar-Pozanti motorway, Turkey
- North Tarrant Express near Dallas, Texas, USA
- I-225 On-Ramp to Southbound I-15 Ramp widening, Salt Lake County, Utah, USA
- Langeni, South Africa
- RC 62 near Sion, Switzerland
- RN 116, Crevoux du Palliat, France
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The Reinforced Earth® technique, a major innovation

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Highway C470, Denver, Colorado, USA
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Sustainable Technology