

Secugrid®

Stable embankment on soft soil

Project name
Pekan – Terapai Slope Repair, Malaysia

Responsible authority
Jabatan Kerja Rakyat (JKR) /
Malaysia Public Works Department

Product
Secugrid® 80/20 R6





Fig. 1: Failed road embankment



Fig. 2: Rehabilitated road section using Secugrid® geogrid reinforcement

Pahang is the largest federal state in Peninsular Malaysia. Pekan is the royal capital city and it used to be the capital city in the past. With a population that is considered high in Peninsular Malaysia, an adequate infrastructure within or intercity of Pahang is required.

Challenge

After a rainy season, a section of road embankment between Pekan and Terapai collapsed. The 20m high embankment has been investigated and it was found that there are 4 main reasons for the collapse, namely:

- excessive surface runoff seeping into road embankment
- insufficient road side drain
- damaged existing pipe culvert at the toe of slope, which caused water ponding
- flood during the monsoon season, which lasted almost 4 months, had softened the existing foundation soil

Since the intercity road is one of the critical connections in Pahang, fast and reliable repair was required.

Solution

In order to comply with the project demands, it was decided to construct a reinforced soil embankment using an uniaxial PET Secugrid® geogrid. Secugrid® geogrids are made of stretched, flat monolithic

polyester (PET) bars with welded junctions. The main feature of Secugrid® is its high strength mobilisation at low strain with immediate force absorption and low creep tendency. It perfectly matched the project conditions to reinforce the backfilled soil. Secugrid® provides interlocking of the granular fill material and friction on both sides to increase the shear resistance. Secugrid® has a low creep tendency, which ensures the stability of the structure over a long service life. Secugrid® also helps to distribute the vertical load from the pavement more evenly, ensuring the stability of the whole structure and reducing the tendency for differential settlement within the reinforced soil structure.

A design analysis was carried out for the reinforced soil structure and Secugrid® was found to be sufficient for this structure. The Naue Wrap system was chosen as facing system for the 75° slope angle. This system consists of a non-galvanized steel mesh which acts as temporary formwork and a Secugrid® geogrid that encapsulates the reinforced fill using the wrap-around method. An erosion control mat placed behind the geogrid prevents soil erosion in the facing area.

A total of 25.000m² of Secugrid® was supplied to site. With the success of the proposed Secugrid® solution, the traffic between Pekan and Terapai can now be accommodated efficiently.



Fig. 3: Installation of steel mesh as temporary formwork