

**ARAMEX DUBAI LOGISTIC CITY FACILITY EXPANSION**  
**DUBAI WORLD CENTRAL, DUBAI, UAE**

**RETAINING WALLS & SOIL REINFORCEMENT**

**Product: ParaLink<sup>®</sup>, Terramesh<sup>®</sup>**

**Problem**

A strategic initiative of the Government of Dubai, Dubai World Central (DWC) is a master-planned city around the Al Maktoum International Airport, the largest airport in the world when complete. Covering an area of approximately 145 square kilometers, DWC represents a self-sustained ecosystem that seamlessly integrates this global trade, business, logistics and aviation hub with a smart and sustainable urban city development. DWC will ultimately support a population of one million people. The city will also be home to the World Expo 2020.

Aramex Middle East decided to expand their new facilities at Dubai Logistics City, one of the region's most important hubs for transportation and logistics to be able to maintain their leadership position in the Region.

In the proposed plot for expansion facilities, there exists a level difference of 8m along a length of 500m that required near-vertical retaining walls due to parking areas required below the wall and an access road above the wall.

The road above the retaining wall would accommodate high traffic loads (50KPa) due to the heavy logistics of the Aramex Cargo facility. Due to the proximity of the project location to the recent earthquakes in the region, the retaining walls had to be resilient to seismic loads. The building structures, road and retaining walls would need to have a design life of 100 years.

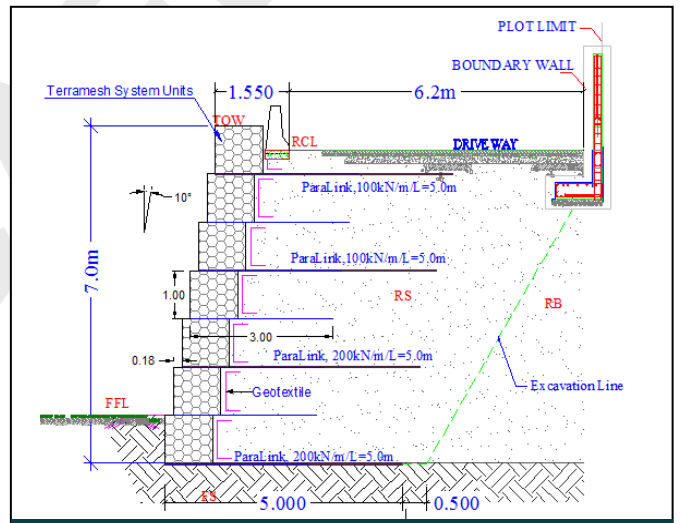
**Solution**

The scheme consultant originally proposed mass gravity gabion walls; ideal at accommodating seismic loads without damage, but would require approximately 8,800m<sup>3</sup> of rock-fill. The project team approached Maccaferri to explore more efficient alternative proposals .

The fast-track project required the whole construction to be completed in less than one year and consequently main contractor M/s. Amana Steel Building & Contracting LLC, were keen to save construction time where possible; the construction of 8,800m<sup>3</sup> of gabions would be time consuming. Furthermore, rock fill would have to be imported from nearby Emirates such as Fujairah or Ras Al Khaimah).



Placing Terramesh and ParaLink soil reinforcement



Typical cross-section through Terramesh structure

**Client:**

ARAMEX EMIRATES LLC

**Main contractor:**

AMANA STEEL BUILDINGS CONTRACTING LLC

**Consultant**

GLOBAL ENGINEERING CONSULTANTS

**Designer:**

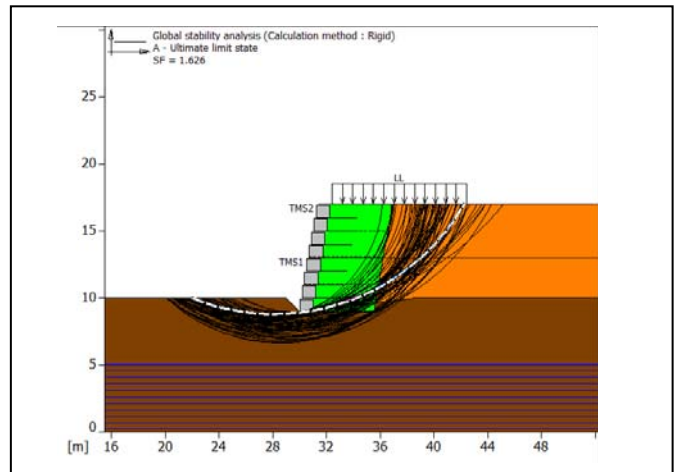
MACCAFERRI MIDDLE EAST LLC

**Products used:**

TERRAMESH SYSTEM - 1,540 UNITS  
 PARALINK 100 & 200 - 8,100M<sup>2</sup>

**Date of construction**

Feb - Oct 2015



Design output using MacSTARS analysis software



Completed structure awaiting installation of parapet crash barrier adjacent to highway

To overcome these conditions, the contractor proposed an alternative solution using Maccaferri's Terramesh<sup>®</sup> reinforced soil retaining wall solution. The proposed system would have the same final stone finish appearance as the specified gabion wall, but with additional benefits;

- 2,900m<sup>3</sup> of gabion stone fill vs 8,800m<sup>3</sup>
- Faster to install - uses geogrid soil reinforcement and structural backfill can be placed faster than gabions can be installed

Accordingly, Maccaferri was subcontracted for design, supply and construction supervision assistance of the 4 - 8m high, 500m long retaining wall.

In this project, the Terramesh<sup>®</sup> System was supplemented with ParaLink<sup>®</sup> geogrids as the primary soil reinforcement to form a hybrid reinforced soil structure.

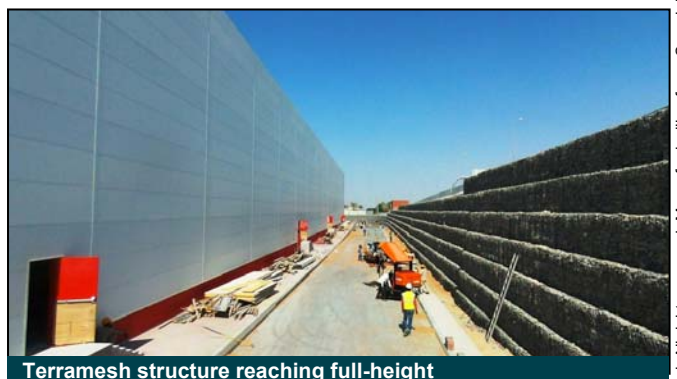
Terramesh consists of a modular gabion fascia element, with an integral steel wire woven mesh geogrid tail. The geogrid is sandwiched between layers of compacted backfill, reinforcing it. This enables the soils to stand steeper, accommodate greater loads and settle less than an unreinforced soil.

On the taller reinforced soil structures and where the geotechnical forces are far higher, the Terramesh<sup>®</sup> units provided secondary soil reinforcement only. Primary soil reinforcement was provided by ParaLink<sup>®</sup> geogrids. ParaLink<sup>®</sup> is engineered from polyester fibres encased within an ultra-tough polyethylene sheathing. Available in strengths up to 1350kN/m, it is ideal for use in these demanding seismic zones. In this project the ParaLink<sup>®</sup> was spaced at 2m vertical spacings.

The installation with a total face area of 2900m<sup>2</sup> was completed successfully to the satisfaction of the project team.



Terramesh fascia unit filling. Note Paralink geogrid in-place



Terramesh structure reaching full-height

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