ENVIROMESH®

CASE STUDY SERIES #4

THE PROJECT	MUTUNDWE TEMPORARY SUBSTATION	**APPLICATION**	MASS GRAVITY RETAINING WALLS
LOCATION	KAMPALA, UGANDA	**DATE**	APRIL 2008

CLIENT	UGANDA ELECTRICITY TRANSMISSION CO. LTD
CONSULTANT	INTEGRATED YMR PARTNERSHIP
CONTRACTOR	AGGREKO INT'L PROJECTS LTD

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MUTUNDWE TEMPORARY SUBSTATION. KAMPALA. UGANDA.

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SERVICES PROVIDED BY ENVIROMESH

- Full detailed designs taking account of site conditions
- Material supply, air and sea freight arrangement
- On-site technical support during the construction programme

PROJECT BUILD COMPONENTS, SUPPLIED BY ENVIROMESH

- Double-twist woven hexagonal wire mesh gabions
- Gabion specification: 80mm x 100mm x 2.70mm wire diameter plastic coated
- Fixing accessories

PROJECT BACKGROUND

International providers of temporary power and temperature control solutions, Aggreko PLC were awarded a multi-million US-dollar contract for the provision of a 50MW temporary power station for the Ugandan Electricity Transmission Company Ltd in the town of Mutundwe, near Kampala, Uganda.

In preparation for the receipt of electricity generating equipment, this split level site required **two** temporary, retaining structures that would need to be in situ for the duration of the contract. One section measured 9 metres high x 92 metres long and the other, 7 metres high x 55 metres long.

Aggreko's specialist project team based in the Middle East approached Enviromesh to provide a 'full and complete' design proposal package to cover both structures. This would need to take into account the supply of materials and related transportation logistics as well as on-site supervision during the early stages of construction. The team of technical experts from Enviromesh would be an integral part of the project, providing the necessary backup and knowledge to ensure the gabions were installed and correctly assembled in accordance with the design proposal specifications.

THE CHALLENGE

There were three critical aspects to the project in Uganda:

- Speed of design to ensure that the walls were designed without delay whilst satisfying the stability criteria of the site and taking account of freely available gabion boxes from stock
- The rapid despatch of materials and delivery to site. Aggreko made it clear that the walls were on the critical project path and delivery was crucial to the success of the site and its ultimate project commencement of producing electricity
- Oversee the initial site installation of the gabion wall using local labour.

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THE SOLUTION

1. MASS GRAVITY GABION WALLS

The solution was two number mass gravity gabion walls designed using product manufactured from a double-twist woven hexagonal wire mesh fabric. These materials were both readily available ex-stock but also flexible in nature – an engineering attribute for gabions that allows for natural settlement particularly when designing such high walls.

2. BRITISH STANDARDS COMPLIANT

Designed in accordance with BS 8002, of specific concern were the high bearing pressures inherent in a design of this type. These were equalised at the toe and heel of the wall through via a seven metre wide gabion apron on the nine metre high wall.

3. TRANSPORT LOGISTICS

The project schedule meant that a fast turnaround of materials despatch was critical if the construction phase was to commence without delay and meet the build schedule. On behalf of Aggreko, Enviromesh organised the air freight of the preliminary consignment of gabions via Global Forwarding, with the remaining items sent on immediately by sea freight across a number of containers to Mombassa Port – to keep freight costs to a minimum. Transportation via road to the site in Mutundwe completed the materials supply phase.

- **Fabric type**
  Flexible double-twist woven wire mesh
- **BS EN 10218-2**
  Steel wire and wire products (general wire dimensions and tolerances)
- **Tensile strength (wire)**
  350 to 500 N/mm^2
- **BS EN 10244-2 (Class A)**
  Zinc and zinc alloy coatings on steel wire
- **BS EN 10245-1**
  Steel wire and wire products (organic coatings, general rule)
- **BS EN 10245-2**
  Steel wire and wire products (organic coatings on steel wire, PVC finished wire)
- **BBA certification**
  Design lifespan up to 120 years in a mild environment

"From technical design and expertise to material supply and on-site training – Enviromesh have been first class in their delivery. We have been supported 100% throughout and have been highly impressed by the professionalism and attention to detail in what has been an important project for us here in Kampala.

AGGREKO INTERNATIONAL PROJECTS LIMITED

4. ON-SITE SUPPORT

As part of the contractural requirements for this project and our own commitment to high standards of service, Roger Farmer, the Technical Director at Enviromesh visited the site from day one. Spending time in Mutundwe with the project managers and the local labour force, Roger was able to ensure the correct installation procedures were followed for the siting of the gabions and correct use of material filling as part of the construction process. Because Enviromesh had provided the technical design specifications and drawings, the project was run efficiently throughout the build phase.