ACE Geosynthetics

Case History

Municipal solid waste (MSW) landfill at No. 6 Naphtha Cracker Project in Formosa Plastics Group (FPG) in Taiwan

Introduction

Because long term shortage of basic petrochemical raw materials, development of mid and downstream businesses have been restricted. Formosa Plastics Group (FPG) has proposed to undertake the No.6 Naphtha Cracking Project near the estuary of Jhuoshuei River in the northest Yunlin County since 1986. The project includes an integrated refinery with an annual processing capacity of 21 million metric tons (450,000 barrels per day) of crude oil, a naphtha cracking plant with an annual processing capacity of 1.35 million metric tons and correlative petrochemical plant, heavy equipment plant, Mailiao industrial harbor, etc. Presently 61 plants have been built. The No. 6 Naphtha Cracking Project length is around 8 kilometers long and it extends the width to 4 kilometers beyond coast line. Because most land is located under the sea level, the project site needs land development reclamation which is about 2,255 hectares.

The job site is situated at the municipal solid wastes (MSW) landfill construction of No. 6 Naphtha Cracker Project. The landfill mainly contains bottom and fly ashes from incinerator and its capacity can reach 600,000m^3. The design uses ACEGrid® GG100-I as the reinforced material of the landfill structure which is bilateral wrap around reinforced embankment. Because the reinforced structure facing can be built as an inclined plane, it can raise the landfill capacity and extend the landfill service life. In the meantime, the reinforced structure can decrease the cost of ash transportation and derivative environmental problems. After construction, the vegetation facing of the landfill improves the project site landscape apparently.

The Design

Since the project site initially is an even land reclaimed from the sea, the ash landfill design uses ACEGrid® GG100-I to build the bilateral wrap around reinforced embankment which the slope ratio is 1(V):0.3(H). After construction, the top width of the embankment is 3.5m and the heights are 6 and 7.5m (foundation height is 3m). The backfill material belongs to sandy soil and its compacted density is controlled to minimum 90%.

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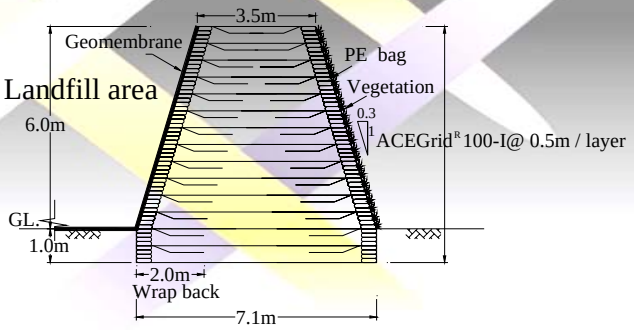
The whole construction consists of two stages. The geogrid quantity at the first stage is 140,000 m^2 and the quantity at the second stage is 200,000 m^2. The amount of geogrid is 340,000 square meters in this project.



Cross section of design drawing

Construction

The construction was separated into two periods. The first period started from October, 2004 and completed in May, 2005. This construction period took about 245 days. The second period started from October, 2006 and completed in July, 2007. This construction period took about 310 days. Both stages of construction lengths are 1300m and 1140m. The two stage structure surface areas per meter length were 12m^2 and 15m^2. The first stage average construction area was 47m^2 per day and required about 571m^2 of ACEGird® on average. The second stage average construction area was 43m^2 per day and required about 645m^2 averagely.

Performance

Since the project site is located on an even area, the ash landfill is built by the bilateral wrap around reinforced embankment. Because the reinforced structure facing can be built as an inclined plane, it can raise the landfill capacity and extend the landfill service life. In the meantime, the reinforced structure can decrease the cost of ash transportation and derivative environmental problems. After construction, the vegetation facing of the landfill improves the project site landscape apparently.

Construction of embankment

Construction of geomembrane

Specification：ACEGird® GG 100-I
Quantity：340,000m^2
Owner：Formosa Plastics Group
Designer：KaiQun Consulting Company
Contractor：QuanDa Engineering Company

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