Pearl River Embankment Protection Nansha District Section Guangzhou City, China

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SUMMARY

This project locates at the lowest reach of Pearl River, in Nansha District of Guangzhou City and it is only about 10 km from the South China Sea.

This project began in May 2006, covers a total area of over 45 000m2, and a total length of over 6 000m. So far 30 000m2 have been completed.

The ecological benefits are quite obvious. The bank was covered with green color 40 days after vetiver was planted, and vetiver became very dense and exuberant one year later and Bahia grass also grew quite lush.

One particularly important point worth mentioning: Vetiver grass showed quite a strong tolerance to salt, flood, heat, and drought. For example, when several clumps of vetiver were planted on the riverbed; they have been submerged during high tide every day, but have thrived vigourously.

Thereby, Department of Water Resources of Nansha District has decided to plant only vetiver and bahia grass on the remaining 10 000m2

It is envisaged that the estuary of Pearl River will exhibit a wonderful and verdant landscape after the whole project is finished.

DESIGN AND SPECIFICATIONS

The organizing unit is the Department of Water Resources of Nansha District.

The contractor is Guangzhou Peifeng Environmental Protection Co. Ltd., a noted vetiver company in Guangzhou

The original embankment was quite eroded, dirty and poorly resistant to floods and waves. The construction procedure was as follows:

- **First the slope of the embankment was reshaped and then divided into 2 sections with a large bench in the middle.**
- **Then the bank was paved and hollow nut-shaped bricks were laid on the slpoes. The diameter of brick's holes is 25 cm and two different depths were tested: 10 cm and 25 cm.**
- **After the physical engineering was finished, the biological engineering began. The brick's holes were first filled with fertile soil then planted.**
- **Since high tides came up twice a day, resulting in submergence in sea water the lower part of the bank; so the selected plants must have strong resistance to salt and flood. (Continued)**

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- **The design specified the following species were to be tested: Vetiver grass (*Vetiveria zizanioides*), Bahia grass (*Paspalum notatum*), *Hemerocallis citrine*, *Arachis pintoi*, and some amphiphytes or hydrophytes, such as *Cyperus alternifolius*, *Caldesia grandis*, *Lythrun salicaria*, and Acorus calamus.**

- **Two months after planting, the results showed that vetiver grass grew best on the lowest section of the slope, and *Cyperus alternifolius* second; bahia grass grew best on the higher part of the slope.**

- **However, plants grown in the brick with 10 cm deep brick holes grew much poorer. This is because the soil layer is too thin, and plant roots could not penetrate through the dense layer under the bricks. Therefore they could not reach nutrients and moisture that plants need for their normal growth.**

- **As a result, the designer finally chose to plant vetiver grass on the lowest part of the slope and bahia grass on the higher part of the slope with 25 cm deep bricks.**

The project


项目名称：广州市南沙区外江堤防工程
Project name: Embankment protection of Pearl River in Nansha District, Guangzhou
建设单位：广州市南沙区水务局
Organizing unit: Department of Water Resources, Nansha District, Guangzhou
施工单位：广州沛丰环保科技有限公司
Constructing unit: Guangzhou Peifeng Environmental Protection Co. Ltd.
技术支撑：中国科学院华南植物园夏汉平博士
Technique support: Dr. Xia Hanping, Prof. of South China Botanical Garden, CAS
施工日期：2006年5月2007年5月
Constructing date: May 2006 May 2007
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23 9 2007

The original embankment was badly eroded, dirty and poorly resistant to floods and waves

First the slope of the embankment was reshaped, the mud flat covered with riprap rock and the slope with hollow bricks

The slope was separated into 2 sections with a large bench in the middle

Both sections were paved with hollow bricks with 25 cm diameter holes. One set is 10 cm deep and the other 25 cm

Vetiver grass 40 days after planting

Bahia grass (*Paspalum notatum*) 40 days after planting

Caldesia grandis 40 days after planting

Cyperus alternifolius 40 days after planting

Lythrun salicaria 40 days after planting

Acorus calamus 40 days after planting

Vetiver grass one year after planting

Vetiver grass one year after planting

Poorer Vetiver growth due to shallow soil in the holes

Vetiver grass one year after planting

An one year old stand of Vetiver grass planting on the mud flat on site, which is submerged twice daily during high tide

Best combination, Vetiver on lower ground and Bahia on higher ground

It is envisaged that the estuary of Pearl River will exhibit a wonderful and verdant landscape after the whole project is finished