# Ho Chi Minh Highway Fourteen Years Later

## (2000- 2014)

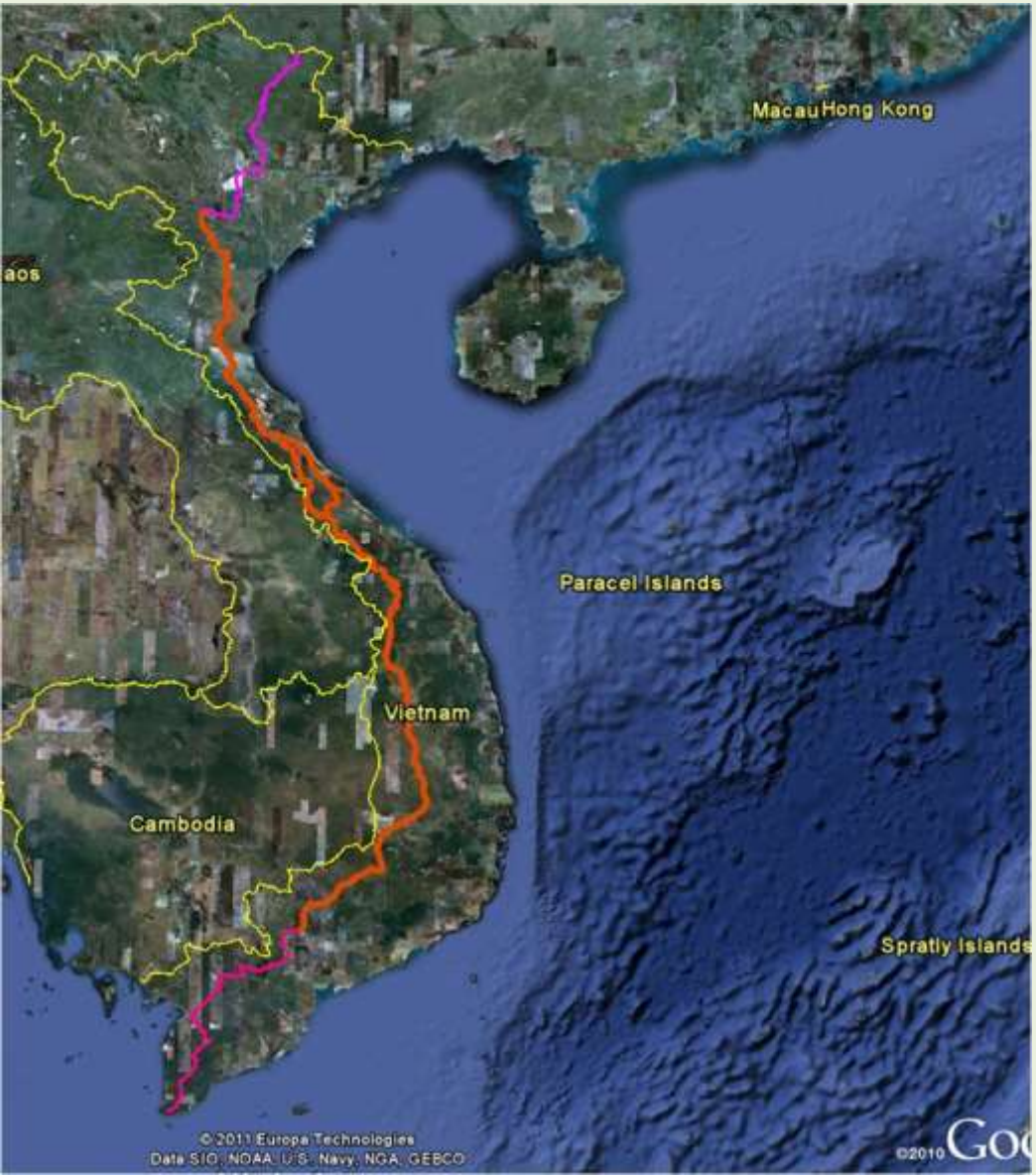
## *A Photo Essay on the Role of Vetiver System in Controlling Erosion on the Highway Following a Visit in February 2014*

**Dr. Paul Truong**

***TVNI Technical Director and Director for Asia and Oceania***
***Veticon Consulting,* Brisbane , Australia**

**www.vetiver.org**
**<P.Truong@veticon.com.au>**

# The Ho Chi Minh Highway (HCMHW)
# A brief Introduction




- Master plan approved by Government in 1997;
- Construction started in 2000;
- 40-100m wide (2-8 lanes), composed of sections:
  - Section 1 (Hanoi-Quang Binh): 500km;
  - Section 2 (Quang Binh-Quang Nam): 2 branches i.e. East HCMHW, 364km; and West HCMHW, 514km;
  - Section 3 (Quang Nam-HCM City): 825km;
- Connects Cao Bang in the North with Ca Mau Cape in the South, totaling in length 3,200km. Connects with National Route No.1 by 20 traverses totaling 1,700km

# Sections of the Highway Revisited

**This Report covers a two day trip in February 2014, over a distance of about 1 000km. Starting west from the coastal National Route No.1 at Da Nang to Section 2 (Quang Nam to Quang Binh) on one of the traverse connecting roads (200km) then north to East HCMHW (364km) and to Section 1 (Quang Binh to Hanoi) (500km)**


The original HCM Trail, started as a goat tract in 1956, then upgraded for bicycles and eventually for trucks and tanks in the 70s. Now further widened for earth moving equipment. Mostly hidden then under a thick canopy of tropical rainforest.
3 2 2002

# CONSTRUCTION PHASE

**Note the scars on the mountain side. Altogether it was almost 5 000km long, including traverse connecting roads**

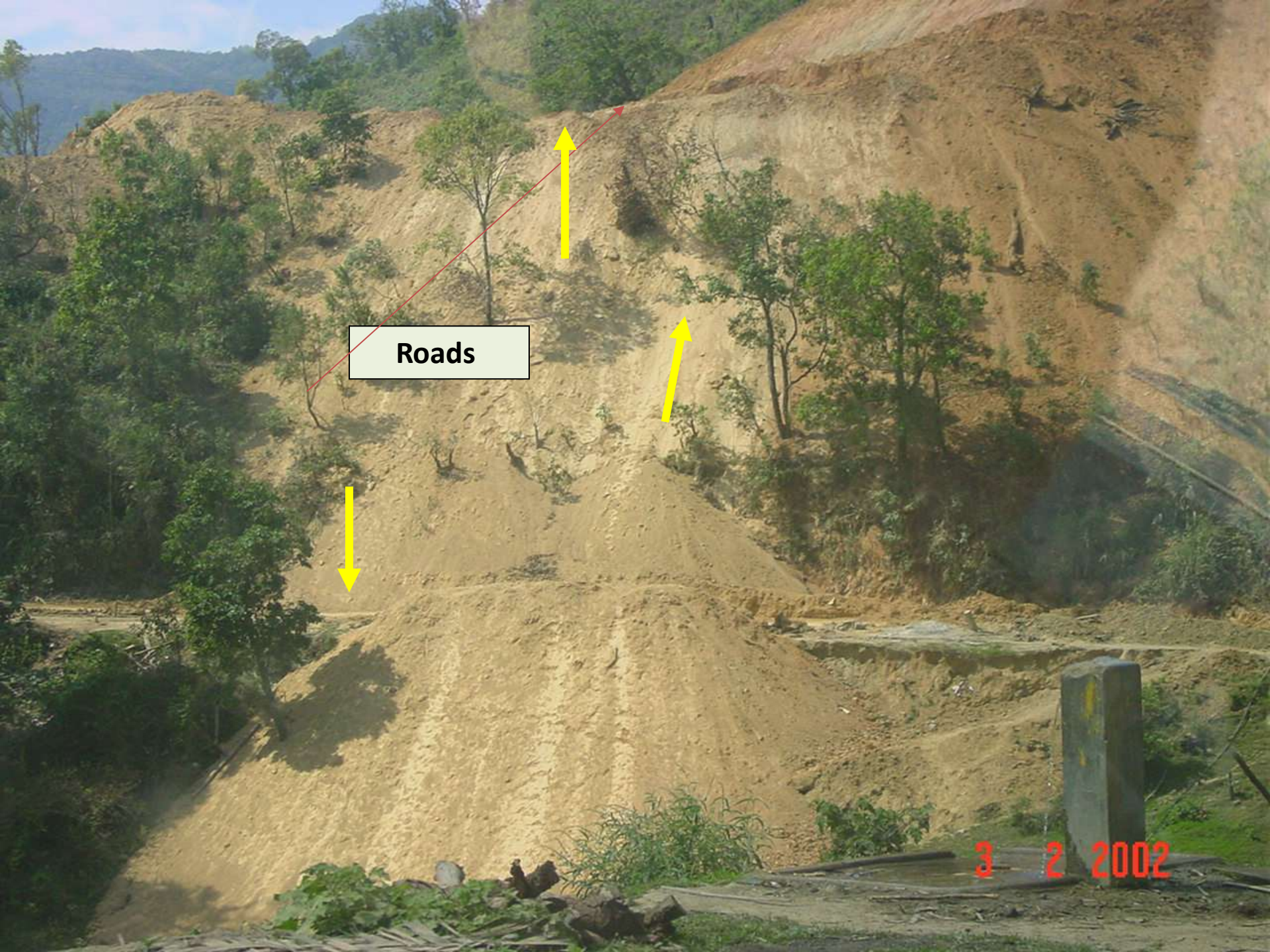

Road
3 2 2002


Road
3 2 2002


Road
3 2 2002


Road
3 2 2002


Road
3 2 2002

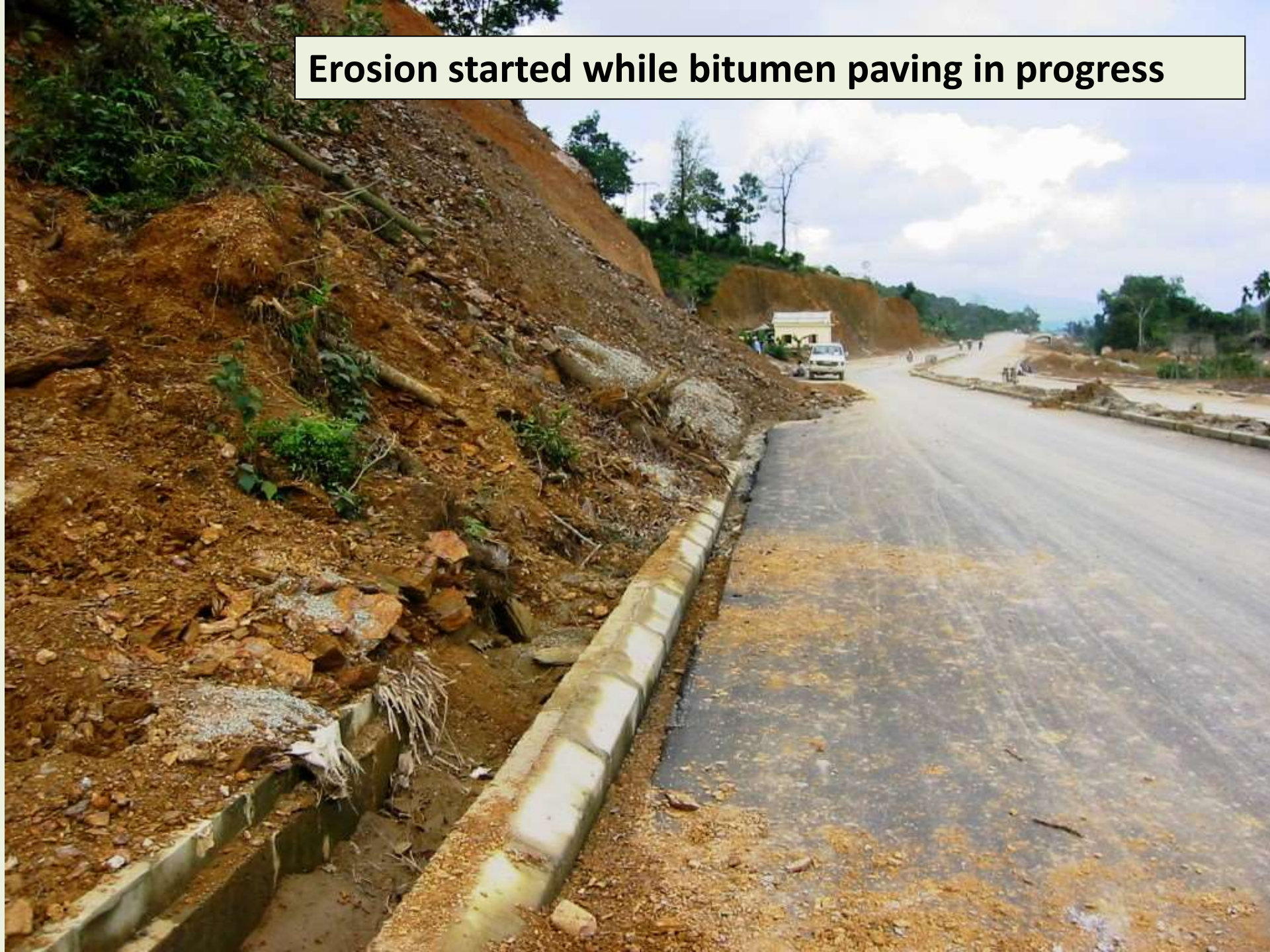

Roads
3 2 2002

Very steep cutting and no benches or drainage channels


Collapsed under its own weight in the dry season, 3 months after cutting


**Very steep cutting and no benches or drainage channels**


Erosion by one early storm
3 2 2002


Erosion started while bitumen paving in progress

## Erosion started while bitumen paving in progress

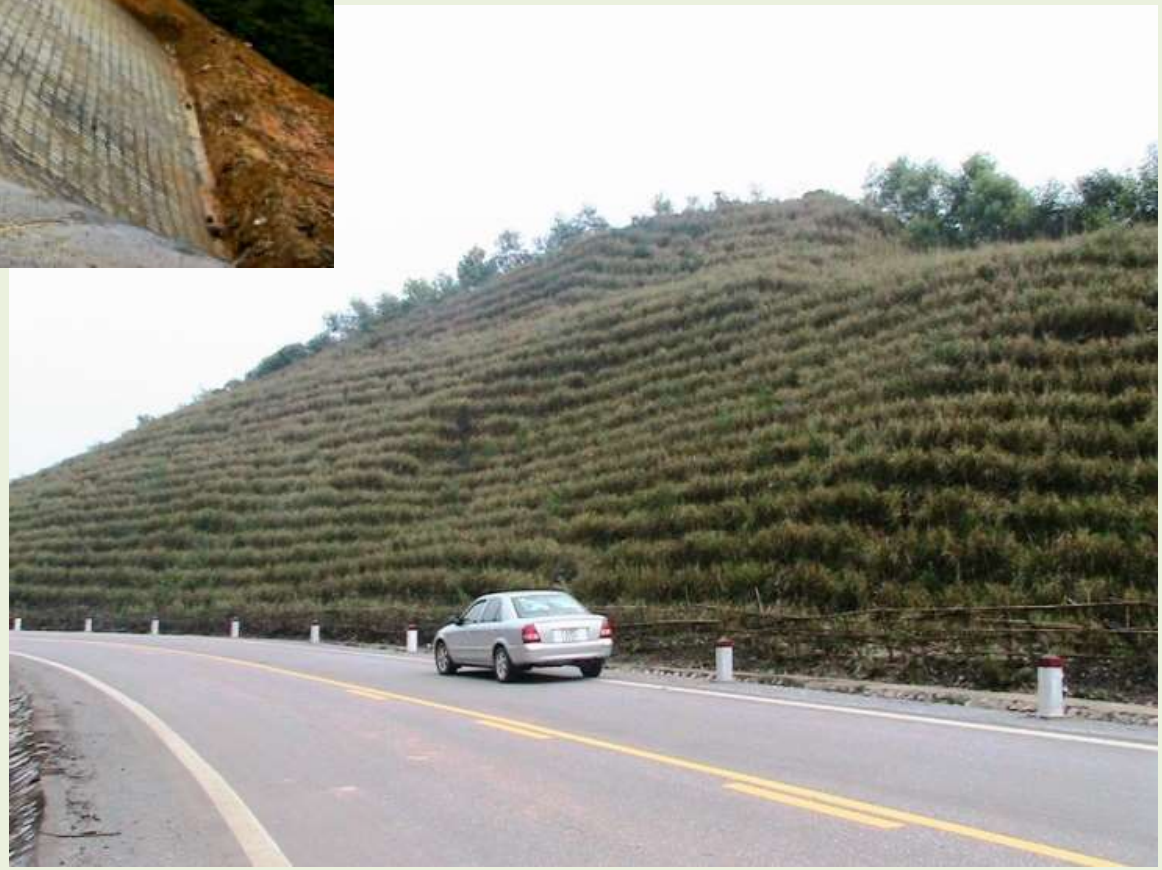
## Conventional hard structure solution: Small and large retaining walls

**But these massive and costly retaining walls by themselves did not stop erosion during the typhoon season**

**If unprotected, this was what happened during the typhoon season**

## OPTIONAL SOLUTIONS

1. **Extremely costly conventional hard structure or**
2. **Vetiver Bioengineering**



## Conventional hard structure solution:

**Very large and costly retaining walls**

# VETIVER BIOENGINEERING: *APPLICATION PHASE*

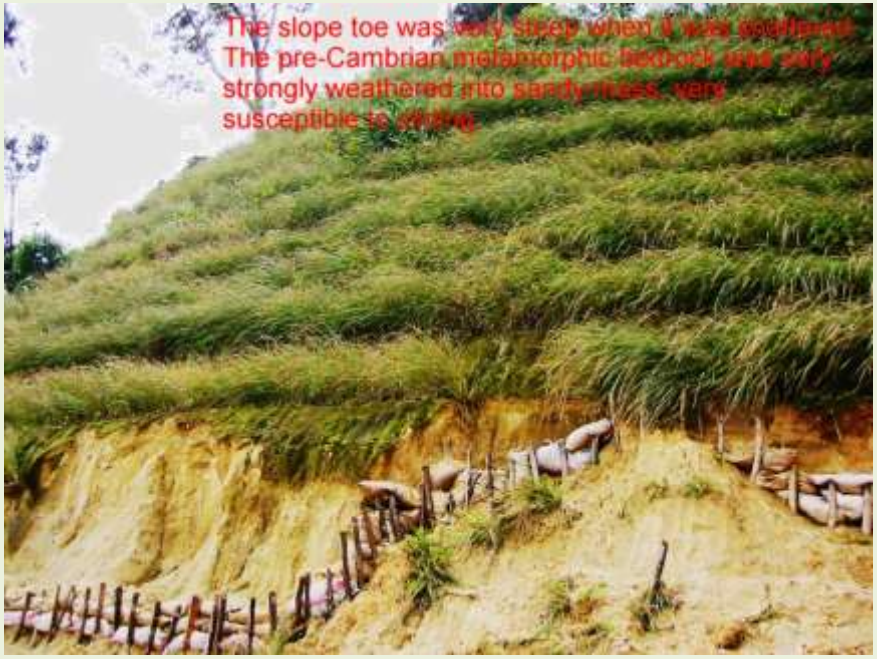
**Following the obvious failure of the costly conventional measure in controlling the erosion and landslips along the Highway, the Ministry of Transport adopted VS as a preferred erosion control measure on all new sections of the Highway and on eroded slopes of the completed sections.**

**One to two month old planting on newly constructed batters**

# One to two month old planting on old eroded batters

**One to two month old planting on old eroded batters**


**Two to three month old planting on old eroded batters**


**Ten month old planting, good growth but toe slope should be protected**

# SPRING PASS DEMONSTRATION SITE

**This mountain pass is called Spring Pass (Deo Lo Xo ) because it is so winding and twisting like a metal spring. This pass is at 1060m altitude and 2000mm annual rainfall, with torrential rain in summer and occasional typhoons.**

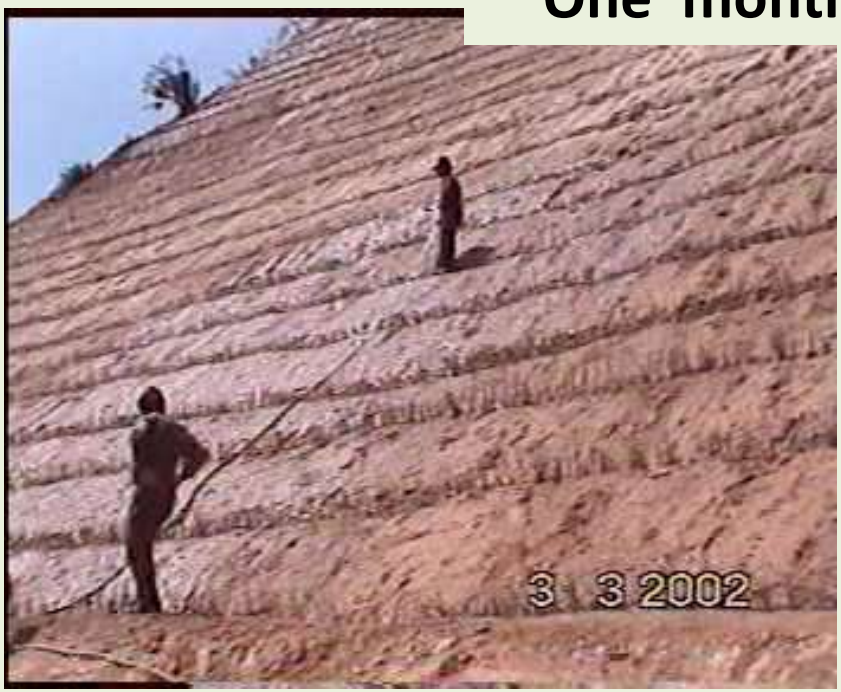


**Cut batter (1.5:1) 55m vertical drop and about 100m slope length**

**Using abseiling method, contour furrows were prepared for planting at VI 1-2m**



**One month after planting**




**Despite badly designed (no benching and Internal drainage), this very steep batter was successfully stabilized 3 years after planting. Survived several typhoons**


With Vetiver
No Vetiver

# FAST FOREWARDS: 14 YEARS LATER

## *February 2014*


**Over the distance of about 1 000km of Sections 1 and 2 of the HCMHW, stretching over a wide range of geology, topography, altitude and climate, it was very pleasing to note that the Vetiver System has successfully stabilized this highway in general .**

## *General view along the Highway in February 2014*

## *General view along the Highway in February 2014*

# General view along the Highway in February 2014



# General view along the Highway in February 2014


## General view along the Highway in 2014

# General view along the Highway in February 2014

## General view along the Highway in February 2014

# SOME BEFORE AND AFTER SCENERY

2005

2011

2005

2014

# SOME BEFORE AND AFTER SCENERY




# SOME BEFORE AND AFTER SCENERY




# SOME BEFORE AND AFTER SCENERY

***2005*** ***2014***

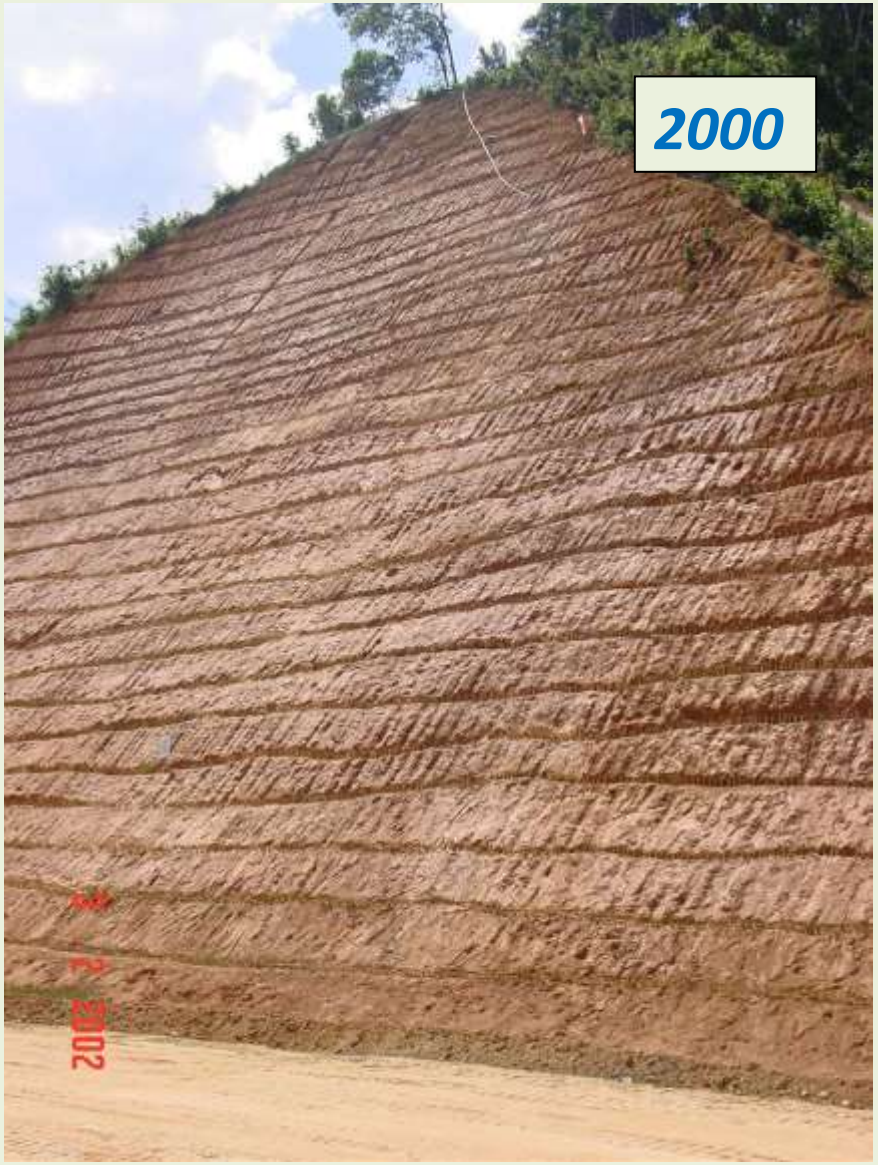
# SOME BEFORE AND AFTER SCENERY


**2005**

**2014**

# SOME BEFORE AND AFTER SCENERY

## Spring Pass (Deo Lo Xo )





# SOME BEFORE AND AFTER SCENERY


2014

# EFFECTS OF SHADING ON VETIVER GROWTH


**In area where local species did not re-established, vetiver persisted and continue to provide protection**


**Vetiver persisted and continue to provide protection to vulnerable area**

**It can be found mostly along the edges of the original planting**

## 2014 Some vetiver but mostly endemic plants

# GENERAL OBSERVATION AND SOME CONCLUSIONS

- **On the whole there are no serious erosion occurs over the length of about 1000km of Sections 1 and 2 of the HCMHW and Vetiver System has successfully stabilized these sections of the highway**
- **This survey did not cover Section 3: from Quang Nam to HCM City where some shallow (small slips 1-2m deep) and more serious large (deep-seated slides 5-10m) occurred.**
- **Occasional eroded batters and small slips occurred, partly due to uncontrolled animal grazing and poor internal drainage**

- **Vetiver has accomplished its mission as a pioneer plant, providing effective erosion control on very steep and hostile slopes, trapping sediment and runoff water, producing a micro environment to facilitate the establishment of endemic plants**

- **All these plants re-established naturally by themselves, mostly from endemic seeds from the surrounding areas. Some were blown in from further out.**
- **In general, the original vetiver was shaded out by the spread of the local plants. It can be found only along the edges of the original planting**
- **Most importantly, in area where local species did not re-established, vetiver persisted and continue to provide protection**
- **Based on long term experience in subtropical Australia, local trees will eventually come back to provide a permanent protection**

***Vetiver planting created favourable condition for local species to come back and faded away due to shading, but it persisted where local species could not come back.***

Despite badly designed this very steep batter has survived several typhoons

Equally effective in erosion control but definitely not equally effective in cost of establishment and long term maintenance

## SOME FOOD FOR THOUGHT

**Alternative Options:**

- Green and environmentally friendly soft measure
- Sterile conventional hard structure