

# REPUBLIC OF TOGO

## **LNBTP**

Work - Freedom - Homeland

LABORATORY NATIONAL OF BUILDING AND PUBLIC WORK

BP: 20100 LOME - TOGO

Tel.: 225 - 62 - 83 / Fax: 250 - 81 - 34/250 77 61

E-Mail: [inbpt@ids.tg](mailto:inbpt@ids.tg)

<http://www.lnbtp.tg/>

Tax ID No.: 970369x



### LABORATORY STUDY OF THE PRODUCT

## **AGB (AggreBind)**

### **AN AMERICAN PRODUCT FOR THE TREATMENT OF SOIL ON ROADS OF THE LAND**



## **TECHNICAL REPORT**

October 2012

[www.aggrebind.com](http://www.aggrebind.com)

# SUMMARY

No.	DESIGNATIONS	Pages
I	Introduction	12
II	Different materials laboratory study	12
III	Characteristics of raw materials quality	13
IV	AGB Product Description	13
V	Instructions for use and treatment	13
VI	Laboratory study with the product AGB	14-15
VII	Conclusion	16

## -I / INTRODUCTION

The interim program of priority actions of the **Government of Togo** in road infrastructure included some measures that have resulted in a willingness **to challenge the state highway system planning and** to ensure better transport of people and goods (goods). In improving the service level of some degraded roads due to natural phenomena (flooding following heavy rains, floods, etc.), the search for solutions has led to the study of a U.S. product **AggreBind (AGB)** for the treatment of soils for roads and especially for dirt roads. The purpose of this study is to **verify the level of mechanical performance of materials under the effect of product** indicated. The **National Laboratory of Building and Public Works (LNBTP)** Togo (West Africa) was responsible for verification of product compliance.

## II-/ VARIOUS MATERIALS RESEARCH LABORATORY

The different materials used for laboratory studies were sought in the Maritime region of Togo and grouped into four types:

- **Clay sand of the croute continental fine material with average plasticity, collected at 10 km from Lomé.**
- **Silty sand of the locality of Gounkope, fine material with no plasticity, collected in the lagoon area of the coast.**
- **Gravelly Laterite of the village Djemeke, material of a granular structure, collected more than 20 km from Lomé.**
- **Crushed sand of the region of Gneiss d'Agbelouve.**

### III / CHARACTERISTICS OF RAW MATERIALS

The following table presented the appearance of the materials analyzed in the raw state (without adding product AGB)

Grain size distribution % ≥ 20mm	Atterberg limits % ≤ 80μ	Proctor LL	Wearing Index CBR			
			IP	W%	γd	95% OPM
Clay sand on the outskirts of Lomé						
0	15	April 16	May 14	10.0	1.99	7
Silty sand Gounkope						
0	13	ES = 28/35	10.6	1.92	44	
Gravelly lateritique of Djemeke						
14	12	May 14	14	8.3	2.15	50
Crushed Sand Gneiss						
0	09	ES=82/906,7	6,7	1,76	8	

### IV / PRODUCT DESCRIPTION AGB

According to reports in the document made available to the LNBTP, the test product is called **AGB**, a stabilizing layer of pavement materials manufactured by an **American Society (Company) for the treatment of pavement materials** to ensure better traffic on routes maintained or upgraded. The product generally improves the mechanical performance of materials in place, significantly reducing operating costs of involving new (specified) materials and (their) transportation.

Its environmental impact is significant due to the restricted openings to support the extraction of new materials. (Positive environmental impact because of reduced excavation/disposal limiting need for new materials.) The product involved in the construction of roads, parking areas and car lots.

### V / MODE OF USE AND TREATMENT

The materials are wetted considering the quantities necessary to compaction. The optimum water content (H<sub>2</sub>O% OMC) is always referred to in the humidification process of materials for obtaining better compaction. For one (1) liter of this product we used 3 liters of water to where a mixture of 4 liters liquid is used for testing proctor and CBR (California Bearing Ratio).

### -VI / RESEARCH LABORATORY WITH THE PRODUCT AGB

Analyses were performed in laboratory to verify the performance of the product from the processing of materials sandy clay, silty gravel and laterite on the basis of the obtained mixture.

## LABORATORY RESULTS

Apart from other parameters (type, identification of materials), puncture resistance (resistance to indentations) defined by the bearing ratio (standard) CBR treated materials underwent only slight changes.

On the other hand, if we take into account the provisions for conservation techniques (protocols to make samples) recommended by the client (28 day air) on the basis of information provided by the supplier (manufacturer) of product, regardless of conventional systems of conservations (preparation) (4 days of imbibition or other), results in simple compression that remains favorable for **the materials listed in the table on the previous page. The values obtained in basic (standard) compression tests on the treated materials produced with AGB varied from 04 to 19 bars while those raw materials are between 02 and 06.**

*Opening the two part breakaway moulds.*



*Samples are stored dry for 28 days.*

*On day 26 samples are surface sealed to complete water resistance.*



A significant improvement is shown under the effect of the product ranging from double to triple the results obtained in basic (standard) compression of the raw materials, which can lead to hope in order that reasonable values of CBR. The quality of the finished product in this case is assessed on the basis of the results of the (standard) compression.

### COMPRESSION TABLE RESULTS

The following table presented the appearance of materials analyzed with or without addition of AGB product looks and kept for 28 days

Grain size distribution	Atterberg Limits	LL	Compression ( Bars)				
			IP	W%	yd	Raw	With
% ≥20mm	% ≤80μ						
<b>Clay Sand</b>							
<b>0</b>	<b>15</b>	<b>29</b>	<b>10</b>	<b>10,</b>	<b>1,97</b>	<b>5 - 6</b>	<b>16 -19</b>
<b>Silty Sand</b>							
<b>0</b>	<b>13</b>	<b>ES =</b>	<b>6,2</b>	<b>1,9</b>	<b>0 - 1</b>	<b>4 - 5</b>	
<b>Gravelly lateritique</b>							
<b>14</b>	<b>12</b>	<b>37</b>	<b>12</b>	<b>7,5</b>	<b>2,10</b>	<b>4 - 5</b>	<b>6 - 7</b>
<b>Crushed Sand of Gneiss</b>							
<b>0</b>	<b>09</b>	<b>ES =</b>	<b>6,5</b>	<b>0</b>	<b>8 - 9</b>		
<b>Phosphate Sand</b>							
<b>04</b>	<b>14</b>	<b>38</b>	<b>13</b>	<b>2,01</b>	<b>2 - 3</b>	<b>4 - 5</b>	

### **VII-/ CONCLUSION**

The laboratory study showed that an improvement has been reported on the results obtained in simple compression molds preserved in air (air-cured) for 28 days, carrying confidence to a significant increase in CBR values. Product AGB showed a performance that met the conditions required for road construction (dirt roads, air parking, parking) with improved mechanical characteristics of materials to a considerable extent even in the presence of water.

The LNBTP recommends that effect the execution of a test board on a path in order to assess land identified from periodic monitoring of the quality of which depends the life of the product

**Lomé, October 22, 2012**

**Study Manager**

Kokou  
HOENDU

**Director of Civil Engineering**

Yawo  
ATIVON

