



HAL
open science

Experimental characterization of Gaboon specie under cyclic compressive loading at different internal moisture content

Claude Feldman Pambou Nziengui, Rostand Moutou Pitti, Samuel Ikogou, Serge Ekomy Ango

► To cite this version:

Claude Feldman Pambou Nziengui, Rostand Moutou Pitti, Samuel Ikogou, Serge Ekomy Ango. Experimental characterization of Gaboon specie under cyclic compressive loading at different internal moisture content. COST Action FP 1303 „Performance bio-based building materials” , Aug 2016, Poznan, Poland. hal-01616944

HAL Id: hal-01616944

<https://hal.science/hal-01616944>

Submitted on 15 Oct 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Experimental characterization of Gaboon specie under cyclic compressive loading at different internal moisture content

Claude Feldman Pambou Nziengui^{1,2,3}, Rostand Moutou Pitti^{2,3,4}, Samuel Ikogou¹, Serge Ekomy Ango⁴

¹ ENEF, BP 3960 Libreville, Gabon, pclaudefeldman@gmail.com

² Université Clermont Auvergne, IP, UBP, BP 10448 Clermont-Ferrand, France, rostand.moutou_pitti@univ-bpclermont.fr

³ CNRS, Institut Pascal, BP 63171 Aubière, France

⁴ CENAREST, IRT, BP 14070, Libreville, Gabon

Keywords: cyclic loading, moisture content, Aucoumea Klaineana Pierre, tropical species

The aim of this work is to show the experimental behaviour of Gaboon under cyclic compressive loading at different rate of moisture content. Gaboon (*Aucoumea klaineana* Pierre) is a tropical wood which grows in equatorial African region particularly in Gabon (Ikogou et al. 2016).

Material and methods:

According to the standard ASTM-D-143, 22 specimens of Gaboon were dimensioned, brought at different rate of internal moisture content (Table 1) and tested. The first 15 specimens have been loaded monotonously (Fig. 1), then remaining 7 specimens have been each loaded 5 times at different level of loading for the compressive cyclic loading (Fig. 2). Before, specimens have been put in water for their saturation in humidity (Table 1).

Results:

Fig.1 presents the evolutions of elasticity modulus (MOE) with internal moisture content (IMC) of specimens coloured in grey (Table 1). This graph shows that MOE decreases with the augmentation of IMC of specimen for a monotonous loading. Fig.2 represent, the curves of cyclic compressive loading done on 7 specimens (Table 1) at different IMC and at different level of forces. These curves shows that, independently of IMC in the cyclic compressive loading the rigidity of material grows with the intensity of load. The precedent investigation shows that for a cyclic compressive loading the intensity of Gaboon growth with the intensity of loading independently of the internal moisture content of specimen. The actual results can be explained by the fact that during the test sample is compacted.

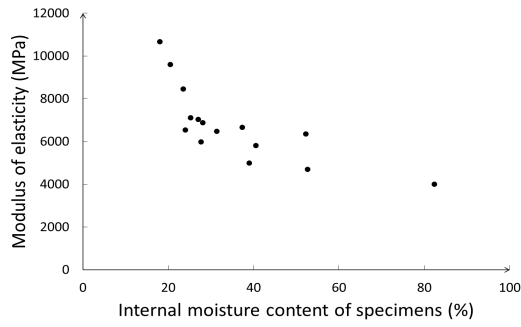


Figure 1: evolution MOE Vs IMC

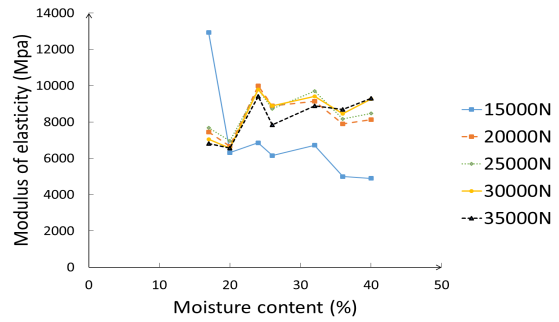


Figure 2: evolution of MOE Vs IMC of each specimen at different level of charge

Table 2: characterization of specimens studied yet

Sample N°	L[mm]	l [mm]	h [mm]	H [%]	M [g]	d [kg/m ³]
E1	49	51	210	52.6	186	0.354
E2	51	50	210	31.4	179	0.334
E3	50	51	200	25.2	201	0.394
E4	49	51	205	30.7	197	0.384
E5	50.5	51	210	20.5	240	0.443
E7	50.5	51	210	39	188	0.347
E9	50.5	51.5	205	26.2	211	0.395
E10	50.5	51	210	20.1	211	0.390
E11	50	50.5	205	40.9	179	0.345
E12	50.5	50.5	200	27.7	184	0.360
E13	51.5	51.5	205	36	192	0.353
E14	51	50.5	210	37.3	182	0.336
E15	51	50	205	52.2	194	0.371
E16	51	50	201	82.3	246	0.479
E18	51	51.5	205	27	183	0.339
E21	50.5	51.5	205	24	184	0.345
E22	50	50	210	40.5	203	0.386
E24	51	52	210	18	291	0.522
E25	50	51	205	23.5	202	0.386
E26	52	50.5	200	28.1	185	0.352
E27	51	50.5	200	17.2	244	0.473
E28	50	50	201	24	207	0.412

In the coming works, a numerical model will be developed in order to compare with experiments.

References

Ikogou S., Moutou Pitti R., Ekomy Ango S. Hydro-mechanical behaviour of *Aucoumea klaineana* under drying process. COST Action FP1303, Madrid, Spain; 24-25, February 2016. ISBN 978-91-88349-16-3

Acknowledgments:

The authors wish to strongly acknowledge the National Agency of Research (ANR) for its financial support of this work through the project CLIMBOIS N° ANR-13-JS09-0003-01 labeled by ViaMeca.