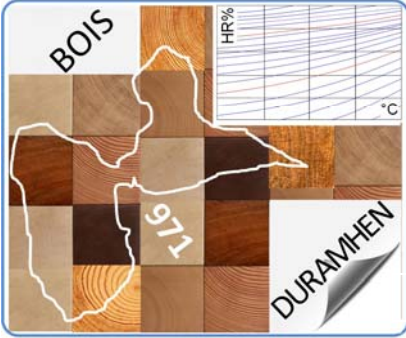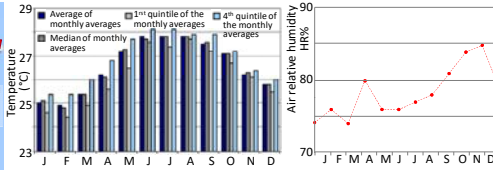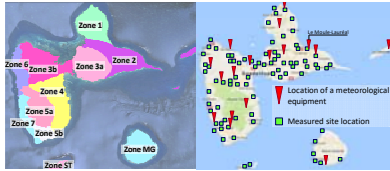# LES STRUCTURES BOIS DANS L'ENVIRONNEMENT GUADELOUPEEN, PROJET BOIS DURAMHEN 971

IMPACT OF ENVIRONMENT ON GUADELOUPEAN TIMBER STRUCTURES, BOIS DURAMHEN 971 PROGRAM

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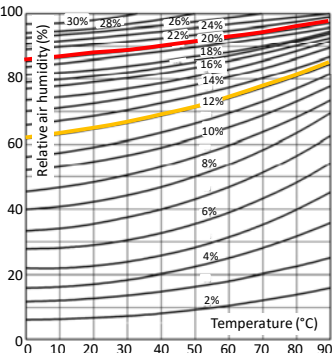Luc Cador[3], Thierry Lamadon[4], Laurence Romana[5]
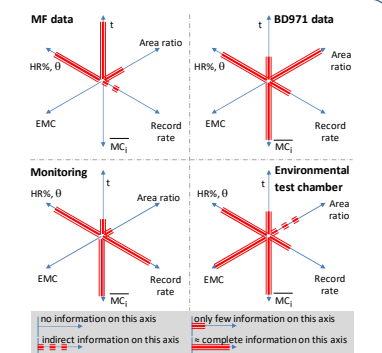
FWI context

Wooden house is a traditional mode of construction in the Caribbean Islands. The buildings have to face hurricanes, earthquakes, high level of humidity and high temperatures. Regarding Eurocode standard dedicated to timber structures, EC5, French west indies islands are often considered as a service class 3 area (the most sever environmental conditions). This decision is mainly based on a lack of information on the real local climate and its consequences on timber elements of buildings. The goal of the European project, Synergîle-Bois Duramhen971: BD971, is devoted to the study of environmental effects on timber structures in Guadeloupe island.

METHODOLOGY OF THE STUDY

The first step of the study is the acquisition of data, it is based on two sources: the set of measurement given by *Meteo France* stations (here Relative Humidity HR% and temperature θ of surrounding air) and measurements on sites of the same parameters and also wood moisture content. Some sites are chosen to be very close to *MF* stations in order to compare HR% and θ coming from *MF* measurements and BD971 records. Sites are recorded twice a month and one site is under hourly monitoring. Sets of data are linked by Equilibrium Moisture Content diagram EMC, with the limits of EC5 moisture content: 12 and 20% are the upper limit of service class 1 and 2 respectively. 100 sites, ≈ 300 elements and ≈ 500 faces are measured during 12 to 18 months. MC measurements give an important data base for moisture content present in tropical and soft woods used in FWI. HR% and θ give parameters to analyze the conventional EMC as used in European areas.

FIRST RESULTS AND ANALYSIS
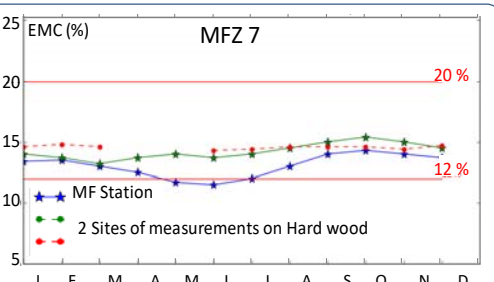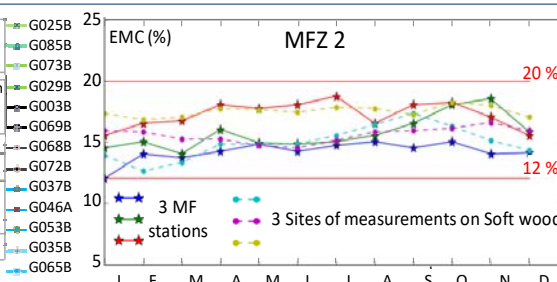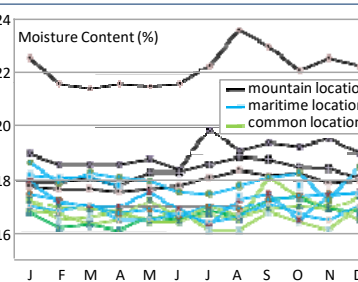
The comparison of the Meteo France measurements with those of BD971 shows a good consistency of the results (HR% and q). BD971 results allow us to reach information on the whole building area of Guadeloupe. MC measurements are also in a good accuracy with environmental test chamber results. First figure shows the variability of MC measurements on same bus stops located all over the island. Most of them can be considered in service class 2. The two over figures present for two Meteo France zones the calculated EMC with HR% and q with MF data and BD971 measurements for building realized with soft wood and tropical wood. Part of results shows homogeneous MF zones and wood EMC. But some other MF zones are not in accuracy with a common wood moisture content.

CONCLUSIONS

The results obtained by the different approaches, the comparison of measurements, the calibration of measurement equipment conducts to a wide data base and give interesting projections. On most of the *MF* stations and the different sites, the calculated and measured moisture content values fit well inside a *MF* Zone. In this case, service class zone might be clearly defined. In other zone(s), the service class determination have to be more detailed and deepened in order to propose a more precise map. The variation of MC during the year should be determinant for that. The work presented here will be continued until the end of 2018. Parameters such as Wind could be taken in account and its influence can be more or less important regarding softwood or hardwood. Equilibrium Moisture content diagram should be also modified for hardwood; the actual tests on environmental chamber might produce this kind of information. This study will be also completed by a similar work for Martinique island.
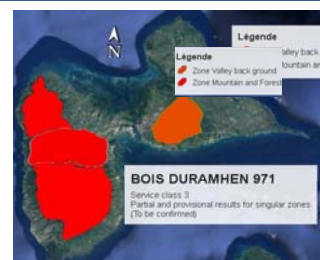
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