Natural Durability Variations of Malaysian Timbers from Sarawak after 26 Years Exposure by Stake Test

[1]Andrew H.H. Wong and [1,2]Ling Wang Choon

[1] Respectively, Associate Professor and doctoral research scholar
Faculty of Resource Science and Technology
Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

[2]Retired, Senior Assistant Director of Forests
Timber Research and Technical Training Centre (TRTTC), Km 10, Old Airport Road, 93660, Forest Department, Sarawak, Malaysia
Emails: wangchoon@gmail.com; awong.unimas@gmail.com

Abstract

An extensive graveyard stake test site was established in 1977 in Sibu, Sarawak, Malaysia, to evaluate the in-ground durability of 132 Sarawak wood species, mainly hardwoods. Test samples were planted at 100 x 50 cm spacing. Authenticated wood specimens from 3 trees of each of 132 species were processed into 20 replicated outer heartwood (or else undifferentiated heartwood) stakes of 19 x 19 x 457 mm to represent outer heartwood which were planted to a depth of 228 mm and rated at 6 months intervals using a 5-point visual termite or decay rating scale of ASTM D1758 method. The criteria for a wood species natural durability classification was regarded as the moment when the mean visual rating for a sample of replicated outer heartwood stakes was about 7 (moderate degrade) for commercial relevance (rather than zero for total failure as applied by others), after several months (or years) of exposure regarded as the stake service life being subsequently assigned a 4-point natural durability classification among 1 (very durable) to 4 (non-durable) for 132 wood species. The stakes were also continuously rated until destroyed (rating zero) as a technical requirement. Stake service life data collected over 25 years were analyzed with SPSS software. Stakes of many species were destroyed between 5 and 15 years while the outstandingly durable species belian (*Eusideroxylon zwageri*) was only reduced to a mean rating 7 after 26 years exposure. Among several wood species tested, particularly variations in natural durability between the different species belonging to the red meranti group, yellow and white meranti group, keruing group, selangan batu group, potential plantation species, heavy hardwoods, medium hardwoods, light hardwoods and the softwoods were demonstrated. Judging by the overall population of 2720 outer heartwood stakes (all species), the decay pressure appeared to be considerably higher (*ca* 74% by 25th year) than termite pressure (<5% by 25th year) at the Sibu test site.

Keywords: natural durability, stake test, ASTM D1758, tropical timbers, Malaysian hardwoods, Sarawak

1. Introduction

In the 1970's, it was difficult to obtain information on natural durability of Sarawak timbers in ground contact representing the current Malaysian biological hazard classes H4 and H5 (Wong 2004). Though some Sarawak timber species were previously tested in England (Browne 1959), these durability values are expectedly lower than their service life in the tropics with relatively higher decay hazard (Wong *et al* 2004) and inherent termite hazard. For example, Findlay (1985)