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Abstract. This current study was conducted to establish a bolted connection experimental database on Malaysia woods. The effort of improving the retrofit guideline in designing the wall-diaphragm connections of masonry buildings can be continuously done. Brittle failure verifications on the Meraka hardwood to verify the occurrence of row shear failure are presented in this paper. The hardwood species was selected due to its common use as structural rafters and joists in the construction of roof and floor diaphragms of masonry buildings, respectively. Ten groups of a single row of steel-wood-steel (SWS) connections loaded parallel to the timber grain were tested. Each group was prepared with a total of ten replicates of specimens. Comparisons of bolted connection strength between the experimental results and the predictions of the existing design equations are discussed. It was found that the timber standard of Malaysia (MS544) too conservative in estimating the strength, whilst the Row Shear Model (RSM) is more comparative.

1. Introduction

Quenneville [1] stated that the community of the international timber engineering has agreed in principle that the bolted connection capacity determination in design standards should be based on the models that are capable to identify possible failure modes of the bolted connections. Both modes of bearing and fracture wood failures that exhibit ductile and brittle, respectively, are to be considered. Any of these failure modes provide the lowest strength should be the one that govern the connection performance. To review the existing design equations in estimating the timber bolted connection strength loaded parallel to the grain, the descriptions of the timber code of Malaysia and the Row Shear Model (RSM) are given in the following paragraphs.

In accordance to the Malaysian timber standard [2], the permissible load (F_{adm}) of a laterally loaded bolted connection system can be referred to the Section 11.2.3 of the document and as per given below.

$$F_{adm} = k_1 k_2 k_{16} k_{17} F \quad (1)$$

where,

k_1 = duration of load factor, see Table 4 of [2];
k_2 = i) dry timber is equal to 1.0 or ii) wet timber is equal to 0.7;
k_{16} = i) bolts that transfer load through metal side plates of adequate strength and the bolts are a close fit to the holes in these plates provided that b/d > 5 (where b