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THE 11TH INTERNATIONAL INNOVATION, INVENTION & DESIGN COMPETITION INDES 2022

EXTENDED ABSTRACTS BOOK



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ROAM SCALE: K3 TOOLS FOR ENGINEERS

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ABSTRACT

ROAM Scale is a bearing stress scale that acts as an alternative to determine the value of modification factor, K_3 while K_3 is a modification factor for bearing stress in order to get permissible stresses for timber flexural members.

Keyword: ROAM Scale, bearing stress, modification factor, K₃.

1. INTRODUCTION

One characteristic of wood that is crucial for structural construction is its bearing strength. The behaviour of the structure at all points of contact between wooden elements depends on the strength of the bearing. Permissible stresses for timber flexural members are governed by particular conditions of service and loading as given in Clauses 9 and 10 (MS544 Part 2) and by additional factors given in this clause. They should be taken as the product of the grade stress given in Clause 7 (MS544 Part 2) and the appropriate modification factors.

Two important things that need to be considered in order to get the modification factor for bearing stress are the length and the position of bearing. At any bearing on the side grain of timber, permissible stress in compression perpendicular to the grain, f_{cn} , is dependent on the length and position of the bearing.

2. METHODOLOGY

The permissible stresses given in Table 1.0 for compression perpendicular to the grain are also the permissible stresses for any length at the end of a member and for bearings 150 mm or more in length at any other position.

Length of bearing (mm)	10	15	25	40	50	75	100	150 of more
Value of <i>K</i> ₃	1.7 4	1.6 7	1.5 3	1.3 3	1.2 0	1.1 4	1.1 0	1.00
Interpolation is permitted								

Table 1 Modification Factor for Bearing Stress, K3



However, for bearings less than 150 mm in length located 75 mm or more from the end of a member as shown in Figure 1.0, the permissible stress may be multiplied by the modification factor. Thus, there is no allowance needed to be made for the difference in intensity of the bearing stress due to bending of a beam. The bearing area should be calculated as the net area after allowance for the amount of wane.



Figure 1 Position of End Bearing

3. FINDINGS

ROAM Scale is proposed to make it easier to determine the value of interpolation for modification factor, K_3 . ROAM Scale assists engineers by providing tools for them to determine the value of interpolation for modification factor, K_3 .



FIGURE 1 Roam Scale



4. CONCLUSION

There are few positive impacts towards society when applying an innovation in life. Firstly, designing and providing new tools can help tackle societal problems. Moreover, this type of innovation makes lives better because by creating new and exciting prospects, works can be simplified or problems can be solved especially in finding a value of interpolation for modification factor, K_3 . Lastly, ROAM Scale has allowed the process of determining the value of modification factor, K_3 smarter and faster than ever before.

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