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Standard Test Methods for Establishing Clear Wood Strength Values¹

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INTRODUCTION

The development of safe and efficient working stresses for lumber, laminated timber, plywood, round timbers, and other solid wood products, each with its own special requirements has, as a common starting point, the need for an authoritative compilation of clear wood strength values for the commercially important species. Also required are procedures for establishing, from these data, values applicable to groups of species or to regional groupings within a species where necessitated by marketing conditions. This standard has been developed to meet these needs and to provide, in addition, information on factors for consideration in the adjustment of the clear wood strength values to the level of working stresses for design. Since factors such as species preference, species groupings, marketing practices, design techniques, and safety factors vary with each type of product and end use, it is contemplated that this standard will be supplemented where necessary by other appropriate standards relating to specific work stresses for each such product. ASTM Practice D 245 is an example of such a standard applicable to the interpretation of the clear wood strength values in terms of working stresses for structural lumber.

A primary feature of this standard is the establishment of tables presenting the most reliable basic information developed on the strength of clear wood and its variability through many years of testing and experience. The testing techniques employed are those presented in Methods D 143. Among the recognized limitations of such strength data are those resulting from the problems of sampling material from forests extending over large regions, and the uneconomical feasibility of completely testing an intensive sample. A practical approach to the improvement of strength data is through the application of the results of density surveys in which the specific gravity of the entire forest stand for each species is determined on a sound statistical basis. Through regression equations derived from presently available strength data, revised strength values are established from the specific gravity-strength relationship for clear wood. This procedure greatly extends current capabilities to develop new estimates of strength and to improve or verify estimates made in the past.

1. Scope

1.1 These test methods cover the determination of strength values for clear wood of different species in the unseasoned condition, unadjusted for end use, applicable to the establishment of working stresses for different solid wood products such as lumber, laminated wood, plywood, and round timbers. Presented are:

1.1.1 Procedures by which test values obtained on small clear specimens may be combined with density data from extensive forest surveys to make them more representative,

1.1.2 Guidelines for the interpretation of the data in terms of assigned values for combinations of species or regional divi-

sions within a species to meet special marketing needs, and

1.1.3 Information basic to the translation of the clear wood values into working stresses for different solid wood products for different end uses.

1.1.4 For species where density survey data are not as yet available for the reevaluation of average strength properties, the presently available data from tests made under the sampling methods and procedures of Methods D 143, or Practice E 105, are provided with appropriate provision for their application and use. Because of the comprehensive manner in which the density survey is undertaken, it follows that the reevaluated strength data are intended to be representative of the forest stand, or rather large forest subdivisions.

1.1.5 Some useful mechanical properties (tensile strengths parallel and perpendicular to grain and modulus of rigidity for a longitudinal-transverse plane) have not been extensively evaluated. Methods are described for estimating these properties by their relation to other properties.

¹ These test methods are under the jurisdiction of ASTM Committee D-7 on Wood and are the direct responsibility of Subcommittee D07.01 on Fundamental Test Methods and Properties.

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