Simplex Cap Nails - Product Testing Results

Re: Holding Power of Roofing Nails in 3/8" and 1/2" Plywood

Introduction

Plywood in 3/8" and 1/2" thicknesses has been used for more than twenty years for roof sheathing under asphalt shingles and built-up roofing, with satisfactory results. It is estimated that such uses are at a current rate in the neighborhood of one billion square feet annually. Because of lack of information chiefly on withdrawal strength of nails, the bonding of built-up roofs has generally been limited to 5/8", and more recently to 1/2" plywood.

Prior Tests

Prior testing by the Douglas Fir Plywood Association has indicated that good withdrawal strengths could be obtained by the use of special deformed shank nails in thin plywood. (See DFPA Laboratory Report No. 26, test data on shingles nailed to plywood sheathing, and laboratory report no 61, an investigation of nails for attachment of asbestos cement shingles to 5/16" Douglas fir plywood.)

Purpose of Present Tests

The tests described in this report, therefore, had two objectives:
(1) To determine the withdrawal strength of various roofing nails from 3/8" and 1/2" plywood, both Douglas fir and Western softwood, under varying moisture conditions.
(2) To determine the loads required to pull a roofing nail head through roofing felt, both single and multiple layers. The felt pull-through values were to provide a guide to the level of performance required in withdrawal resistance.

Materials

Plywood

Three panels of 3/8" Douglas fir Plywood and one panel of 1/2" Douglas fir Plywood were obtained from different sources. To permit matching of adjacent specimens in each panel all those selected had single-piece face veneer. Moisture content of the plywood varied, since one of the purposes of the test was to determine the effect of different moisture contents on strength. Moisture contents appear with the appropriate withdrawal test values.
Three panels of 3/8" Plywood (Western softwood Group 1) were obtained from different sources. Veneers in all panels were of true fir species; that is, noble fir, silver fir, grand fir, etc. To permit matching of adjacent specimens all panels selected had single-piece face veneer.

Test Report:	104-97
Product:	1" Round Metal Cap Nail
Test:	Withdrawal Resistance, Pull-Out
Procedure:	APA Withdrawal Tests

Static Withdrawal Test

Metal Cap Length	Metal Cap Shank Type	Deck Type	Deck Thickness	Resistance (lbf)
1"	Annular Grooved	Plywood	3/8"	112
1"	Barbed	Plywood	3/8"	95
1"	Annular Grooved	Plywood	1/2"	155
1"	Barbed	Plywood	1/2"	81
7/8"	Annular Grooved	Plywood	1/2"	128
7/8"	Barbed	Plywood	1/2"	50
1"	Annular Grooved	Plywood	3/4"	218
1"	Barbed	Plywood	3/4"	82
7/8"	Annular Grooved	Plywood	3/4"	224
7/8"	Barbed	Plywood	3/4"	99

Tests as preformed by the American Plywood Association Apply suitable factor of safety to arrive at design loads. The above results were obtained under laboratory conditions.